DIETARY PROFILE OF PRE-SCHOOL CHILDREN OF SLUM DWELLERS OF SHILLONG CITY IN MEGHALAYA STATE

THESIS

Submitted to the

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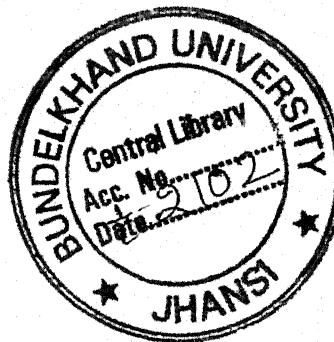
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CERTIFICATE

This is to certify that the Thesis entitled **"Dietary Profile of Pre-school Children of Slum Dwellers of Shillong city in Meghalaya State"** submitted to the Bundelkhand University, Jhansi for the degree of Doctor of Philosophy is a bonafide research work carried out by **Mrs. Alka Singh** under my guidance and supervision. The assistance and help received during the course of investigation and source of literatures have been duly acknowledged.

Mrs. Alka Singh has worked for more than 20 months on the approved subject.
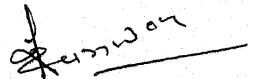
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CERTIFICATE

We the undersigned members are the Chairman and Co-Chairman of

Mrs. Alka Singh, a candidate for the degree of Ph.D. in Home Science (Food & Nutrition) agree that the thesis entitled **"Dietary Profile of Pre-school Children of Slum Dwellers of Shillong city in Meghalaya State"** may be submitted by her in partial fulfillment of the requirement for the degree.

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Date: 17-6-05

Place: Kanpur

Asingh

(Alka Singh)

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INTRODUCTION

INTRODUCTION

There is someone who has to suffer for progress. Usually those 'someone's' are the poorest and indubitable. They seemed to have compromised with a migrant, unyielding and irreconcilable today nudging aside a bright and promising tomorrow. These someone's are the downtrodden or the oppressed of the society, crushed by "wheels of progress". These downtrodden are not localized in any one region or nation but are to be found as the 'crushed' or rather the pugmarks of 'wheel of progress' in all the developing or under developed countries. Since the progress has its roots mainly in the cities, these down trodden are also bound to get rooted in these cities. In these big townships/cities they initially take asylum under the flyovers, under the bridges, on footpaths as side walks on the railway platforms or other public places but gradually they start setting in the unoccupied lands in the hearts of the cities sometimes in outskirts of the cities.

Their abodes get the name "slums' and they become the slum dwellers. These slum dilate at an alarming rate to set up small pieces of land and become patches of trait on the magnificence of the cities.

The person behind the population of slums is clear and obvious. A fairly good number of India's rural population is unable to afford to have its both end meet. The exodus of people to the cities with not so certain hope of survival follows as a natural consequence.

At present a quarter to one third of urban population in our country lives in slums. Slum population is growing at an uncontrollable or alarming rate.

Causes of growth of slums

Slums are everywhere. No city is without slum. Causes of slum are complex and interacting origin can be stressed to rapid influx of workers from village to town following rapid growth of industries.

Various reasons given in seminar for slum 'clearance' held in May 14-20, 1957 in Bombay. Some of them are listed as –

(i)   When economic and political development precide physical development and there is absence of social organization to promote adaptability to urban condition and growth of social consciousness.

(ii)   Absence of health, education and community welfare services and welfare agencies in areas predominantly occupied by low income groups.

It seems that problems of slums dwellers are going to get worse in near future in India. These problems are the identification of the slum. Problem of personal disorganization, poverty, unemployment, beggary, alcoholism and drug addiction, prostitution, disorganization, communication, corruption, martial, crime, fecundity (more children), bad habits, extra vagance, sickness, social evils, banking and credit facilities and problem of health services.

Slum areas have a birth rate 43 per cent higher than non-slum areas, a rate matched in turn by a death rate which is 50 per cent higher. Slum dwellers are handicapped by their problems because they are economically poor, illiterate and cannot approach hierarchical level and the population rate is such that they are bound to be poor. In slums there, exists the 'culture of poverty' and the preconditions of 'culture of poverty' are the following.

The setting is a cash economy, with wage labour and production for profit and a persistently high rate of unemployment and under employment at low wages, for unskilled labour. The society fails to provide social, political and economic organization, on either a voluntary basis or by government imposition, for the low-income population. There is a bilateral kinship system centered on the nuclear progenitive family, as distinguished from the unilateral extended kinship system of lineage and clan. Dominant class asserts a set of values that prizes thrift and accumulation of wealth and property, stresses the possibility of general mobility and explains low economic status as the result of individual inadequacy and inferiority (Oscar, L., 1966).

The problem of poverty encompasses the whole family and it is the childhood a time of hope and promise, a time of hardship on whom the burdens of poverty fall heavily.

Gabriela Mistral (Nobel Prize winner Chilean poet) said that "Many things we need can wait, the child cannot. Now is the time his bones are being made, his mind is being developed. To him we cannot say tomorrow, this name is today".

Early childhood, is the preschool age and also known as 'pregang age', the 'problem age and age of exploration, when the child is learning foundations of social behaviour.

Born free and equal, a child comes into the world with immeasurable possibilities that need to be brought out by parents within a congenial atmosphere, proper food and care and with least hurt to child's personality (Matthai, 1997).

Pre-school children are our future citizens form an important segment of the Indian population. They contribute to the vital human potential and impart strength to the national economy and development.

The period of pre-school or early childhood begins after babyhood and continues upto the age of six year old. This is a very critical period of child growth and development. Physical growth is important as it meant the progressive development of various parts of the body their capacity to function. The rate of physical growth may be determined by some external and internal factors like nutrition, fatigue, rest, exercise, work, heredity, illness and secretion of the ductless and endocrine glands. So, if required balance diet is not given to a child, his/ her health will deteriorate. Similarly, hard work, lack of hygienic conditions of living may cause disease and adverse effects on the general health.

The pre-school age mortality in India is as high as 11.2 percent of all deaths. This high mortality, which is largely due to infection and malnutrition, is characteristic of this age group in underprivileged areas. Malnutrition was shown to be an underlying cause in 3.4 percent of all deaths in young children and associated cause is no less than 46 percent (WHO, 1995).

The importance of the first 5 or 6 years of life of a child for its growth and development is well known. Any adverse influences operating on children during this period (eg., malnutrition and infection) may result in severe limitations in their development, some of which at least are irreversible. The concept of vulnerability calls for preventive care and special actions to meet the biological and psychological needs inherent in the process of human growth and development (WHO, 1980).

In pre-school year, the child is very much an organic part of the immediate family. Whatever happens to him or her affects the other members of

the family, and vice versa. Therefore "child health" has to be " family health". It depends upon the family's physical and social environment, which includes the lifestyle, customs, culture, traditional habits and the child bearing and child rearing practices are greatly influenced by this. Studies show an increase in the prevalence of malnutrition in families with more than 4 children. In short, fewer children would mean better nutrition, better health care, less morbidity and lower infant mortality (Park, 1997).

Under nutrition manifests itself and result in deterioration of physical growth and health. The inadequacy is relative to food and nutrients needed to maintain good health. This condition of under nutrition enhances mortality and morbidity among children. The viscous circle of growth faltering of preschoolers in slums could be traced. Poverty – leads to low intake of food and nutrient – leads to under nutrition and repeated insults from nutrition related diseases and infection – leads to stunted development of children and growth faltering. Studies by NNMB have actually shown that children of urban slum dwellers and of urban informal sector are nutritionally the most fragile of all groups.

Inadequate feeding have a major effect on whether a child grows normally or not. Nearly 12 million children under five who die each year in developing countries mainly from preventable causes. The deaths of over 6 million or 55 per cent are either directly or indirectly attributable to malnutrition (Ramalingaswami, 1996).

Health and nutrition are the most important contributory factors for human resource development in the country. WHO constitution states that " the enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being without distinction of race, region, political, economic and social condition" (WHO, 1999).

Good nutrition is the fundamental basic requirement for maintenance of positive health. A proper diet is essential from the very early stages of life for growth, development and active life (Gopalan, 1999). A child's nutrition begins from conception itself i.e. right from the intrauterine life of the child. The consequences arising out of malnutrition are not the child's will or making, but a result of the accident of birth in a socio- economic and cultural environment (Ramlingam, 1999).

Under-nutrition starts even at the time of conception (because of extensive maternal under nutrition under weight, poor weight gain during pregnancy and nutritional anemia and vitamin deficiencies). About 30% of the infants are born with low birth weights (<2500g), as compared to less than 10 % in the developed countries. Both clinical and sub-clinical under nutrition are widely prevalent even during early childhood. About 1-2 per cent of pre-school children suffer from severe and mild forms of PEM like kwashiorkor and marasmus. This is only the tip of the iceberg. Country wide survey indicates that more than a half of the Indian pre-school children (1-5 years) suffer from sub-clinical under-nutrition as indicated by low birth weight for age and 65 % of them are stunted, which indicates that under nutrition is of long duration (Rahman and Rao, 2000).

It is important to study an quantification of variation in dietary pattern and adequacies in a developing country like India since diets varies from state to state, region to region, community to community, individual to individual and also various diets has a far reaching influence on health and nutritional status.

The status of women and their living conditions also affect the health and nutrition of a child. The low sex ratio, low literacy rate, low participation in legislative, executive and judiciary process, economic dependence, low nutrition

and health status are a few indicators which characterize the low status of women in India. The United Nation States Human Development Report (1995) has identified three critical areas i.e. access to education, reproductive health and credit resources where women face barriers and therefore, urged that as long as these barriers persist, women will not have equal access to opportunities and to the benefits of development.

Rehan (1998) stated that India is one of the earliest among developing countries to recognize the importance of maternal and child health (MCH) care and organize the health infrastructure to provide MCH care to millions of rural women and children. WHO/FAO and ICMR recommended that the dietary allowance for pre-school age children should include an additional 1200 to 1400 kcal of energy and 23 to 31 gram of protein daily.

Poverty and malnutrition make a ferocious sequence each leading to inadequate diet, poor sanitation, increasing the prevalence of infections. Illiteracy is responsible for lack of nutrition and health awareness and large family size. According to some startling facts that emerged at the UNICEF conference on 'The malnutrition challenge' it seems that in 1990 alone the worldwide loss of social productivity caused by malnutrition amounted to almost 46 million years of productive, disability, free life vitamin and minerals deficiencies more than 5% of GNP (Gross Net Protein) in lost lives, disability and productivity. By this calculation, Bangladesh and India forfeited a total of $ 18 billion in 1995.

Malnutrition is the most widespread condition affecting the health of children. Scarcity of suitable foods, lack of purchasing power of the family as well as traditional belief and taboos about what the baby should eaten, often lead to an insufficient balanced diet, resulting in malnutrition. A childhood mortality

study in the Americas showed that no less than 57 percent of the children who died before the age of 5 years were found to have malnutrition as underlying or associated cause of death, the peak of this mortality being in the post- neonatal period. During 1995, more than 28 percent of the world's children under the age of 5 years were underweight for their age. The proportion ranged from 2.9 percent of the children in developed countries to 31 percent in developing countries (WHO, 1996). In India, the National Family Health Survey (NFHS) 1992-93 included survey of the nutritional status of young children. Both chronic and acute under nutrition were found to be high in all the 7 states for which reports have so far been received, namely, Haryana, Karnataka, Maharastra, Orissa, TamilNadu, Uttar Pradesh and Goa (Govt. of India, 1995).

Malnutrition is the most widespread and serious problem affecting young children. Combined with infection, it is a major cause of death of millions as well as for the retarted growth and development of even greater numbers. Each day about 750 children are affected by poliomyelitis. Hundreds and thousands children in India are affected by tuberculosis causing death in many cases. Whooping cough ravages the respiratory system of hundreds and thousands of children. Diphtheria kills huge number of children and leaves many more debilitated (Haxton, 1984).

Children account for a significant proportion of Indian population, the present population, According to census of 2001, of children of the group of 2 to 5 years is 10.70% (Anonymous, 2001). These children are a critical human resource whose growth and well being will determine, to a large extent, the course of India's social and economic development. Unfortunately, majority of children live under such socio- economic environment that hamper their growth and development. As a consequence, the quality of life of the most of the children continues to be much below the desired standards. This is reflected in

key indicator like high mortality rate of children, high level of morbidity, high incidence of malnutrition and nutrition related disease and low literacy rates.

Most of the Indian children have under growth due to malnutrition. Particularly during pre-school period the protein deficiency is acute. A child of five year old requires nearly fourteen hundred calories of energy for his/her normal growth and for this the child is to be provided with required balanced diet. The children who are not active during this period there is sufficient reason to doubt that they are either having malnutrition or are suffering from any physical ailment. For improving nutrition and health status of women children, government's initiatives so far are encouraging. As emphasized by World Bank documents called " Improving women's Health in India" reproductive health is one of the keys to curbing population. The new approach started from Ist April 1996 focusing on improving reproductive and child health care facilities. This focus will be on better nutrition for women and improved facilities for childhood.

Nutritional awareness and economic independence of the mother are absolutely essential for promoting sound feeding practices. The NFHS survey revealed that there is a definite relationship between immunization, child mortality rate and female literacy. A literate mother is more empowered and is able to decide about her fertility, the family size and child caring practices (Iyer, 1999).

High morbidity and mortality particularly among children are an index not only of low health level but also of inadequate health education. It is true that in context of the wide spread poverty, health and education programme alone cannot solve the problem of ill health and under nutrition, which largely exists

among rural communities. Many children would be protected from the mental and physical effect of malnutrition.

The nutritional status of urban children was found better than rural children. The mean values of nutrients intake of rural children were found higher (expect fat & probable vitamin), but still malnutrition was more prevalent in comparison to urban children (Agarwal *et al.*, 2001).

The dietary patterns, nutritional composition of special foods are consumed by Gujarathis during lactation. Energy, protein, fiber, calcium and iron contents of each special food were computed. The result of the study revealed that the special foods during lactation were wheat rab, moong khichadi, battisa laddu, kottu, bajra roti, ajwain kada, bajra rab, gond ka soont, bydku contained the maximum amount of energy and protein respectively. Gond ka soont was rich in fiber the maximum amount of calcium and iron content was observed in battisa ladu were rich in all the nutrition (Girijamma mulimani *et al.*, 1999).

The pre and post natal education to the mothers created much awareness on the feeding practices of the infants and resulted in better growth pattern of infants in the experimental group than the control group. Hence greater efforts should be taken to educate the community especially the expectant women on better child care practices for improving the nutritional status of the infants who are the future citizens of India (Yegammai *et al.*, 2002).

Country wide survey indicates that more than a half of the Indian pre-school children (1-5 years) suffer from sub- clinical under-nutrition as indicated by low birth weight for age and 65% of them are stunted, who indicates that under nutrition is of long duration.

Some form of malnutrition was seen in the study like PEM, anaemia, none of the disorders were present in severe form. So, the prevalence of malnutrition in North East (Meghalaya) is not so severe especially among the preschool children. The Balwadi Nutrition Programme was started in the year 1970-71 with an objective to provide full nutrition, entertainment facilities and informal school for providing early education to the children of 3-5 years age. There are 5,053 Balwadis in the village/ tribal and urban slums of the country, in which 2.25 lakh children are getting implemented by five voluntary organization of the National level, to whom the Government provides financial assistance (Amirthaveni and Barikor, 2002).

Some of the common nutritional diseases found are protein energy malnutrition, vitamin A deficiency, anemia due to lack or poor absorption of iron and vitamin B complex.

Development can't happen without nutrition and nutrition cannot improve without development. The need for upgrading health and nutritional status of children as an essential pre-requisite to development of a nation and healthier society is universally recognized. There are these preschool children whose nutritional status determine the quality of our nation. All is therefore of primary interest to take care of their health and nutritional status.

The health of a child in the initial stages of life is also found to vary by age (proxy for biological age) and equality of the mother. In India, children are facing several problems as a consequence of lack of knowledge on child development among parents. There is a great need to extend simple, scientific knowledge particularly to rural women.

Religion, caste, mother tongue and place of origin are some of the important cultural variables so far as health and illness in a society are

concerned. Medical scientists have well established close link between cultural factors and personal hygiene, nutrition, family planning, immunization, child rearing, disposal refuse and excreta, environmental sanitation, outlook on health and disease, medical care etc. the way of life.

The place where people live is main cause, which directly or indirectly affects the health and nutritional status of them. People of slums are more susceptible to diseases because they are economically poor, illiterate and cannot approach hierarchical level and the population rate is such that they are bound to be poor. In slums there exists the ' culture of poverty'. Poverty leads to low intake of food and nutrient leads to under nutrition and repeated insults from nutrition related diseases and infection leads to stunted development of children and growth faltering.

Widespread poverty in slums, resulting in chronic and persistent hunger in children especially of pre-school going and infants is one of the major problems of people living there.

Therefore, an attempt has been made by taking up the problem "Dietary profile of pre-school children of slum dwellers of Shillong city in Meghalaya state", so that the problems of dietary intake of families living in slums mainly of pre-school going children can be minimized.

Keeping in view these issues, this study was under taken with following objectives:

1. To study the monthly food consumption of families living in the slum.

2. To compare the food consumption of slum dwellers with the recommended food allowances.

3. To study the dietary intake of pre-school children in the above families.

4. To analyse the dietary intake of above pre-school children in terms of nutrients intake.

5. To assess the nutritional status of the above pre-school children.

6. To find the relationship between the nutrients intake and nutritional status of above children.

7. To give them nutrition education to improve the nutritional status of the families living in the slum.

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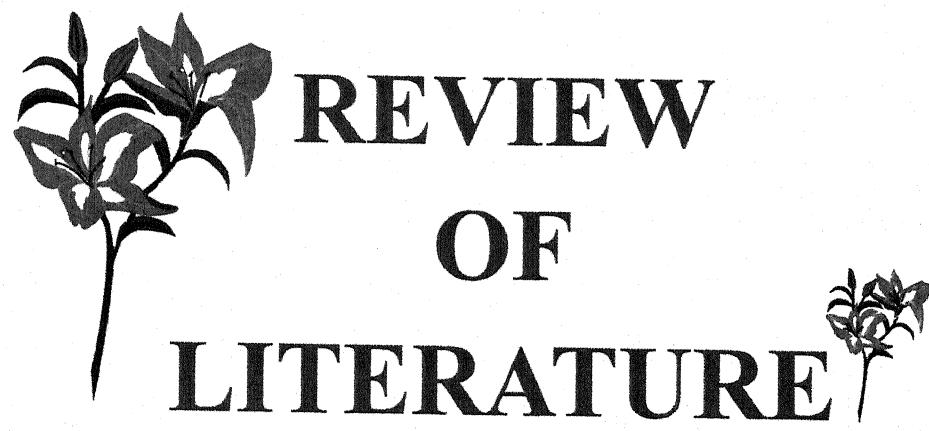
REVIEW
OF
LITERATURE

Chapter-II

REVIEW OF LITERATURE

The review of literature is the basis of most of the research.

"The literature in any field forms the foundation upon which all future work is built."

Review of related literature of the study has become an established practice of all research report but this should not be taken as mere practice or tradition in writing research process. Briefly it may be pointed out that review of related literature gives an insight into the problem. The important aspect of this tradition is that the researcher come to know about the present position of the problem and also the explored and unexplored aspect of the problem. It was in view of these considerations that the investigator shifted the pages of journals, abstracts, so that the different aspect of problem may be elaborated.

Sacher *et al.* (1990) in a cross sectional study with 1054 children (7-60 months) at Ludhiana observed female preponderance among under weight children.

Begum (1990) designed a study to determine the association of risk factors with poor health status of pre-school children living in urban Bangladesh. The study showed the following factors that were significant with poor health status; socio- economic status, nutritional status, sanitation and hygiene practices.

Rubin (1990) stated that environmental factors such as water quality, sanitation and access to medical care play stronger role in child health status than time allocation and maternal employment.

Sepulveda *et al.* **(1990)** conducted a survey in Mexico and estimated that 12.6 million children under 5 year old are malnourished, which corresponds to 30% of children in this age group.

Busi *et al.* **(1991)** studies the growth pattern among pre-school children in urban slums of Vishakapatnam. They observed that the (area) circumference and triceps measurement showed a fall at few age groups. The mid arm circumference and the fat thickness of boys was higher than the girls. The girls at 48 months age showed higher values than boys in all measurements. Arm circumference in all the age groups in present study were lower than that of the well to do Hyderabad pre-school children **(Rao** *et al.***, 1976).**

Islam *et al.* **(1991)** (conducted a survey in coastal Bangladesh) found that the incidence of total nutritional blindness was 0.3% in coastal Bangladesh. In addition to nutritional blindness, four children were found to suffer from developmental cataract and 16 from other disease eg. eye cancer. Nearly 8% families were having children with night blindness.

Pushpamma *et al.* **(1991)** reported, that among the different disease, diarrhoea and viral disease were found to be highly prevalent among the 1to 5 years old children. For every disease the incidence was higher for children of illiterate mothers compared to those of moderately literate and highly literate mothers.

Bose (1991) stated that infant mortality rate is high in India being 91 per 1000 live births as compared to most of the developed countries.

Sharma and Vali (1991) conducted a study to assess the nutritional status of preschool children in a urban slum of Nagpur city by anthropometry and observed that the mean values for mid upper arm circumference of slum

preschool children were lower than that of standards. Statistical analysis showed that mid upper arm of boys were 82 to 93 per cent whereas for girls it was 80 to 90 per cent. Data indicated that 42.66 per cent children were severely malnourished and 33.3 per cent were normal. Most of those severely malnourished children were from the age of 3.

Sharma *et al.* **(1991)** in their study assessed the nutritional status of preschoolers residing in urban slums of Nagpur city and found that 48 per cent children were normal and 37 per cent were severely malnourished.

Anonymous (1992) revealed that high incidence of severe degree of malnutrition was reported (10%) in the ICDS areas of Bihar.

Ghosh (1992) reported that growth of the pre-school children is generally slower than in the first year of life, but continues gradually.

Gray *et. al.* **(1992)** found that children with sickle-cell disease, deficit in height, weight, fat mass and skeletal maturation compared with healthy children without disease.

Reddy *et. al.* **(1992)** concluded, that the percentage of children who were fully immunized increased by nearly 20 percent with every 4 years of maternal schooling.

Srivastava *et. al.* **(1992)** find out that the adult education programme, apart from developing literacy skills of the women, had a significant effect on their knowledge and adoption of the family welfare programme, including health and hygiene practices.

Sharma (1992) revealed that the main economic constraints were scattered holdings, limited resources to purchase inputs, small size of holding. The other problems stated by the farm women were non-availability of technical

knowledge, lack of skill to technical knowledge, non-availability of information on various topics resulting into negative attitudes.

Tejasari (1992) study showed significant (P < .01) relationship between occupation of parent, source of water for drinking and general use verses health status of pre- school children. The other variables namely: household size, food taboo, land ownership, garbage disposal, kitchen sewage, type of toilet and health related factors were found to be significantly related to the health status of the preschoolers.

Beaton *et al.* **(1990)** reported that growth studies carried out in developing countries report peak prevalence of malnutrition and growth faltering between the age of 2 and 3 years.

According to 1992-93 NFHS data, 51 per cent children under four years of age are under weight in U.P. This figure is higher in rural areas (60.1 %) than in urban areas (53.9 %). Under nutrition among female children (57.0 %) is lower than among male children (60.9 %).

Gupta and Shukla (1992) undertook a study to explore some of the epidemiological correlates of PEM in preschool children aged 1-5 years. It was a cross-sectional study covering 538 children in which children were screened for PEM by MAC.

Overall prevalence of PEM is detected by mid upper arm circumferences (MAC) was 67.1 per cent. According to the severity of PEM , 45.5 per cent children had mild grade, with MAC value between 12.5 to 13.5 cm and 21.6 per cent children had moderate to severe grade with MAC value below 12.5 cm.

Jayalakshmi *et al.* **(1992)** in their study to evaluate the impact of ICDS on preschool children in Karnataka found that the deficit in control group was 4.0 per cent in mid arm circumference as compared to experimental group who

had 1.6 per cent deficit MAC. Mid arm circumference measurement of experimental children were found to be higher than the control group, indicating that the ICDS programme was beneficial to them. The 't' test revealed a significant difference in MAC. This might be due to supplements provided to the beneficiaries raising their adequacy from 59.4 to 97.4 per cent for protein and 55.3 to 77.5 per cent for calories.

Jaylakshmi et al. (1992) undertook a study to show the impact of ICDS on overall nutritional status of children in Karnataka in Dharwad block. They found that the ICDS programme has got beneficial effects on its subjects due to the integrated approach of nutrition intervention and education. All the anthropometric measurements of experimental children were found to be higher than control group indicating that ICDS programme was beneficial to them when control group children were compared with experimental group. Five per cent of them were found normal whereas 18 per cent of experimental group were found to be normal.

Gupta and Shukla (1992) conducted a cross sectional epidemiological study among the preschool children aged 1-5 years in the village of field practice area of department IMS, BHU. Nutrient intake of the child was assessed by food recall method. They found that children were consuming in general lesser calories, iron and vitamin A than the recommended ICMR allowances. Regarding consumption of proteins, in general it was quantitatively adequate as per ICMR recommended allowances. Further age wise intakes of calories suggested that the calorie consumption improved over the successive years.

Gupta and Shukla (1992) conducted a study in field practice area of BHU to know the epidemiological correlates of PEM in the preschool children. They found that the prevalence of PEM in children whose mothers were illiterate

was 69.5 per cent as compared to 41.3 per cent in children of literate mothers. This could be because mothers with some formal education were more conscious for proper rearing of their children and were mothers of non PEM children.

Victora (1992) conducted cross-national studies of developing nations have observed that the prevalence of stunting, wasting and under nutrition among pre-school children differed in the various regions of the world, with the lowest prevalence in Latin America and the highest in Asia.

ACC/SCN (1992 & 1993) demonstrated relationships between the prevalence of underweight and several national factors such as gross national product, infant mortality rate, energy intake per capita, female education, child population, food sources of energy, distribution of income, access to safe water, female literacy rate and region.

Santosh *et al.* (1993) stated that the women who are generally illiterate or have low level of education, as a result they lack in knowledge about child rearing practices, health and family planning.

de Onis *et al.* (1993), The World Health Organization (WHO) estimates that there are 192.5 million underweight children and 229.9 million stunted children in the developing world, corresponding respectively to 35.8 and 42.7% of the total world's population.

Annual Report (1993) indicated that maternal employment had no significant positive or negative impact on the nutritional status of pre-school children. This result had great social relevance as the women are being accepted in their role of wage earners to improve the economic status of the family.

Dhanalakshmi, (1993) stated that maternal literacy status is recognized as an important determinant of health and nutritional status of children right

from birth of the children. Newborns of illiterate mothers were lighter than those of literate mothers.

Levin (1993) reported that anaemia was a prevalent health problem in many parts of the world, especially where dietary iron deficiency, malaria and hookworm infection were common.

Sangwan *et al.* (1993) & Chowdhary and Rao (1983) found that the nutritional status of children is associated with the education level and income of parent.

Bapat and Aspatwar (1993) undertook a study of children under age of 12 years residing in the slums of Bombay suburbs and found that 17.41 per cent of preschoolers and 6.62 per cent school age children suffered from PEM. It was also found that per cent prevalence of the diseases was found to be more in preschool children.

Sidhu *et al.* (1993) conducted a study to assess the nutritional status of children of 3-5 years of age group attending Anganwadis at Patiala. Information about dietary intake was collected by interview method. Intake of cereals, pulses, green leafy vegetables, milk and milk products, meat, fish, egg, sugar and jaggery were found to be less than recommended daily allowances of ICMR. Thus intake of calories, β carotene and calcium was lower than RDA.

Sidhu *et al.* (1993) in their study found that the activities of Anganwadi reduce the wide spread under nutrition present among mothers and children of low socio-economic strata and also to attract beneficiaries, so that important activities like informal education, nutritional education can be given.

Bapat and Aspatwar (1993) conducted a study on preschoolers and food and nutrient intake of urban families of poor socio-economic status in slums of Bombay suburbs. They found that the diets of the people were simple. Millet,

rice was the main cereal consumed. The quality of rice purchased was low. The amount and quality of vegetables was substandard. Fruits were consumed occasionally. Palm oil was used as main cooking oil. Protein rich foods such as eggs, milk and poultry were not frequently available to those families, as such food items are expensive and those families cannot afford to purchase them. Due to limited resources these families were unable to buy good quality and variety of foods.

Bavedkar *et al.* (1994) stated that the better nutritional status and feeding practices among some of the children in the under-privileged societies subsisting in a similar situation is attributed to the positive deviance of mothers foe which maternal literacy is key factor.

Devi *et al.* (1994) studied the prevalence of nutritional deficiencies in Parbhani district of Maharastra. The prevalence of nutritional deficiencies were more among the children of small (38.89%) as well as medium (33.33%) farmers than in children of big farmers (16.67%). The children of big farmers showed only the sign of iron, B-complex and vitamin C deficiency where as, the children among the other two groups exhibited inadequacy of energy, protein, iron and vitamin A, B complex and vitamin C. The children of small farmers were found to have deficiency of vitamin D and/or calcium in addition deficiency in mineral (iron) and vitamin (B and C).

Marathe et al. (1994) stated that measurement of weight, height, head, chest and mid upper arm circumference are reliable means by which the progress of normal child is evaluated and gross abnormalities detected even when no other clinical signs of illness are manifested.

Park (1994) reported that mild forms of malnutrition were found in children among 3 and 4 year old.

Sharma _et al._ (1994) reported that those parent who habitually wash their children, all over, before they go to bed, the chances of life and health, to such children is greatly increased by this practices and no doubt much of the suffering of childhood, from cutaneous eruptions, week eyes, earache, colds and fever is owing to a neglect of the skin.

NNMB report (1994), two out of three preschoolers in India are moderately or severely malnourished. According to pooled data from eight states covered, the prevalence of severe and moderate malnutrition is 68.6 per cent using weight/age, Gomez classification.

Sidhu (1994) revealed that there was a positive and significant relationship between education and knowledge gained.

Falola (1994) reported that as the economic situation worsen, the old health problems associated with preventable disease such as malaria, tuberculosis, diarrhoea and malnutrition have all increased and returned.

Das _et al._ (1994) studied the impact of epidemiological factors on intelligence of rural children of 3-6 years old age group belonging to low socio-economic status. Nutritional status of 72 children, was determined and was observed that grade III malnutrition was present only in 6.9 per cent children. Rest of the children were evenly distributed in different nutritional grades. Though the percentage of normal children was highest (37.5 %).

Nutrient intake after nutrition education was corollary to food intake with a surplus intake in calcium and ß carotene attributed to the increased intake of vegetables deficit in iron could not be reduced.

Devdas _et al._ (1994) conducted a study on preschool children of 3 community nutrition centres, Pullampath, Sathyamangalam, Namblyur of Periyar district. The dietaries of the 1-3 year old children contained

predominantly, cereals with least attention to the protective food items such as green leafy vegetables, other vegetables, fruits and milk. The target families though were flesh food eaters, by economic compulsion, included flesh foods only once a week. The cooking practices adopted by the mothers included discarding the excess water after cooking the cereals and vegetables and cutting the vegetables into very small pieces.

Kanwar et al. (1994) conducted a study on preschool children in five selected villages of district Kangra of Himachal Pradesh. The existing nutritional status of 75 preschool children was compared with the recommended allowances.

The energy intake of one-year-old male and female children was 826 and 793 Kcal respectively as compared to recommended daily allowances of 1240 Kcal. The male children were taking more calories as compared to female children. The similar trend of energy intake was visible in other age groups. Protein consumption among different age groups was also alarmingly low. The results indicate that the less protein intake is probably due to relatively high cost of protein rich foods, which do not seem to be within the buying limits of families.

Arokiasamy and Rao (1994) conducted a survey to examine the dietary practices and nutritional status for the poor and rich in Tamil Nadu. They showed that the mean intake levels of food stuffs is very high exceeding far above the recommended allowances for the urban rich households for all food groups excluding cereals and non-vegetable stuffs. Overall, 65 per cent of households were found calorie deficient relative to average recommended levels. The calorie deficient households were nearly 95 per cent for the poor, 45.7 per cent for rural rich and 24.6 per cent for urban rich. A very high positive

relationship was found between per capita consumer expenditure and calorie intake and educational level and calorie intake. Possession of assets and female literacy added for better dietary habits and calorie adequacies.

Sen (1994) undertook a cross sectional study with 1280 under five children in urban slum community of Chetla to identify their nutritional status. Weight/age being the most sensitive indicator was considered, children were graded using the Indian Academy of Paediatrics classification. More than half of under five children were under weight.

Marathe *et al.* (1994) studied the anthropometric profile of children between 6-18 months in Dharwad and found that when children were classified under different grades of nutritional status using the criteria of mid arm/head circumference, Most of the children were found to be marginally undernourished indicating poor health status.

Kunwar *et al.* (1994) in their study found that children belonging to illiterate mothers were receiving less calories as compared to children belonging to education mothers.

Marathe *et al.* (1994) studied the anthropometric profile of children between 6-18 months in Dharwal and found that when children were classified under different grades of nutrition.

UNICEF (1994) stated that any developmental constraints during early childhood characterized by rapid growth rate lead to short term and long-term consequences that limit human potential.

Behrman (1995) and Engle (1995) reported that children from 1-5 years are highly vulnerable to malnutrition due to characteristic rapid growth rate, high nutritional requirements, immature immunological systems which increase susceptibility to infection and sole dependence on their caretakers. It is also said

that the eventual nutritional status of a child depends not only on household resources and food availability but also on the actions of the family members, primarily of the parents and especially of the mothers which substantially determine the health and nutritional status of the children in developing countries.

Math (1995) revealed that none of the children were in severe degree of malnutrition in Dharwad, which was attributed to the beneficial effect of supplementary feeding programme in Creches.

Hendricks and Co-workers (1995) analysed the malnutrition in 268 children and found the prevalence of severe PEM (weight for height), 1.3 per cent, moderate PEM 5.8 per cent, mild 17.4 per cent and none 75.5 per cent.

Neelma *et al.* (1996) concluded that rural and urban, women generally receive information from the most available form of media communication (radio or films) and the adoption of child development practices was positively related to the educational status of the women.

Recent studies from Delhi (**Kapil *et al.*, 1996**) and Maharashtra (**Bapat & Aspatwar, 1993**) also indicated a high prevalence of nutrition deficiency disorders and larger proportions of wasting and stunting among slum pre-school children.

ACC/SCN (1997) concluded, that the economic status is the prime factor determining the purchasing power, thereby household security and in turn nutritional status of the community. In other words, poverty is considered to be the direct cause of malnutrition and no improvement can be expected unless and until poverty is reduced.

Chirmulay (1997) found significant variations in the diets were observed at similar income levels for which female literacy and tastes were found attributable.

Edward *et al.* (1997) estimated that the higher energy availability, female literacy and gross product were the most important factors associated with lower prevalence of stunting, while higher immunization rate and energy availability were the most important factors associated with lower prevalence of wasting.

Saxena *et al.* (1997) report that peak prevalence of wasting was observed in 12-23 mo age while that for stunting was 48-59 mo age in children from Delhi slums promotion of breast feeding is, therefore, highly essential among slum communities.

Prasad (1997) studied the vaccination status among tribal children in thirty-five villages of Bihar. It was found that vaccination status among tribal children was poor because 61 % had not been vaccinated, 3.3% were partially vaccinated (all dose not administered) and only five percent were fully immunized.

Reddy and Reddy (1997) reported that the variables of education, economic motivation and scientific orientation had a strong indirect effect on knowledge of farmers.

Garg *et al.* (1997) conducted a study with the objective of assessing the nutritional status and deficiency disorders among 1-6 years children attending Anganwadis in slums of Ghaziabad. A majority (58.2%) of children were having under nutrition of varying grades irrespective of their sex and caste but influenced by their age and ICDS beneficiary status. Anemia, xerophthalmia and goiter were present in 14.7, 1.6 and 6 percent children, respectively. Average daily dietary intake of energy and nutrients were lower than the recommended

dietary allowances, 41.8 percent of children were having normal nutritional status and rest 39.8, 16.0 and 2.4 percent were suffering from malnutrition of grade I, II, III, respectively. None of them were found to have grade IV malnutrition.

Saraswathi et al., (1997) reported that the prevalence of under nutrition among the children increased as their mother's nutritional status deteriorated, which shows that the mother's nutritional status is a determinant of her child's nutritional status upto 5-6 years of life.

Zaman et al. (1997) revealed that the incidence of respiratory infection in rural children was positively correlated with maternal literacy and environmental conditions.

Roy (1997) and NFHS (1998-99) stated that timely introduction of qualitative supplementary foods was observed to be higher by 2.5 times among infants of literate mothers compared to those of illiterate mothers.

Severe nutritional disorders in infants (**Sur et al., 1997**) and pre-school children (**Bapat & Aspatwar, 1993**) have been reported from slums of Calcutta and Maharastra respectively. Anaemia continues to be a significant public health problem (**Gomber et al., 1998**) among children from slum communities.

UNICEF (1998) on 'state of the world's children', India is home to the world's largest of malnourished children (40%)under the age of five years.

One of the five health outcome targets (out of eleven total targets for health) given by World Health Organisation (**WHO, 1998**) in its recently revised " Health for all in the 21st century" has envised to reduce the percentage of children under five years who are stunted to be less than 20% in all specified groups with in countries by the year 2020.

According to **UNICEF Report (1998)** India's percentage of under five children suffering from under weight are 74 percent, 53 being moderately and severely under weight, 21 percent severe under weight, 18 percent children are wasted moderately and severely, 52 percent are stunted moderately and severely.

UNICEF Report (1998), over 200 million children in developing countries under the age of five are malnourished. Each year malnutrition contributes to more than half of the nearly 12 million under five deaths occur in developing countries. It impairs the immune system of 1000 million young children worldwide. Some 67 million children are estimated to be 'wasted' significantly below the weight they should be for their height – the result of reduced dietary intake, illness or both.

NNMB (1999) stated a wide range of studies connected over the year across the countries have shown a significant positive association between per capita income and growth, reduction in infant mortality rate in the developing countries and have concluded that 'Wealthier is healthier'.

Gopalan (1999) reported that maternal malnutrition and the resulting low birth weight infants remain the single most important factors in infant morbidity and mortality in the world and reduction in its rate has been named by WHO as one of the global indicators of progress.

Skoufias (1999) studied the impact of parental education on Pre-school children's health status; the result showed that mother with secondary education typically have healthier boys than those with less schooling, while this effect was seen for girls only if mother had more than secondary education.

Takyi (1999) studied the prevalence of deficiency disease in pre-school children in Saboba, a rural village in Northern Ghana. The high anaemic rate of

92% was due to high incidence of malaria (32%), hookworm infestation, low intake of vitamin C and low bioavailability of iron from the mainly cereal diet.

Barooah (1999) found that diarrhoeal diseases were major health problems in the country (India) especially among the children below 5 years of age. One hundred million children below 5 years of age, suffer about 300 million of diarrhoea, of which 10% i.e., 3 million may face death.

Huda (1999) showed that health status of children was affected by poor environment and parent's level of literacy. In addition their standard of housing, sanitation and the average number of people per room also affects the health of children.

Chaudhary (1999) revealed that the variable like contact with information sources, education, adoption land holding, annual income and caste were found to have highly significant and positive relationship with the extent of knowledge.

Begin *et al.* (1999) put forth that child growth and development depend not only on food intake and health but also on hygiene and health practices.

Nestel *et al.* (1999) concluded that pre-school children from households that obtained water from a river, stream or lakes were at twice the risk of sub-clinical vitamin A deficiency compared with other children. That some doubled risk was found for children from a household with an outside toilet.

Mini *et al.* (2000) said that through women's work for wages results in family income enabling them to purchase more food leading to better family health and nutrition, it increases the time available for child care. This may adversely affect the health and nutritional status of their children.

Trivedi (2000) said, "Sanitation is a way of life" according to the National Sanitation Foundation. Frequently through out history, the status of the environment, which historically has been equated with sanitation, but is now much broader in concept, has been the measure of civilization.

Rahman and Rao (2000) indicates that more than a half of the Indian pre-school children (1-5 years) suffer from sub-clinical under-nutrition as indicated by low birth weight for age and 65 % of them are stunted, which indicates that under nutrition is of long duration.

Abidoye (2000) reported that most of the malnourished pre-school children belonged to mothers who were illiterate. Sixty seven percent of the malnourished children lived in single room homes, only 12832.1 of the children had access to a regular water supply and 77.7% of malnourished children made no use of health facilities.

Trivedi (2000) said that bodily discharges have considered to be very hazardous to mankind. Intestinal diseases are readily transmitted where water or food is contaminated directly or indirectly by human wastes.

Joshi (2001) stated that multiple regression analysis of predictor variable like household size, mothers age, mothers education and per capita monthly income against criteria variables of weight for height, hemoglobin and nutritional status revealed that 'mother education' was the single most powerful independent variable which was positively and significantly correlated to dependent variables.

Sheela and Shashikala (2001) stated that women particularly in the rural areas continues to bear the burden of their dual role at procedures and reproducers, women's work time and heavy work load are seen as crucial factors affording both their own and their children's health and nutrition. Thus any

system involving women in income generating activities poverty of households may have to focus on the health and nutrition of women and children.

Lakshmi *et al.* (2001) suggested that the nutritional status of children of working women was poor and the prevalence of diarrhoea was higher among such children (Chaudhary *et al.*, 1986).

Devadas *et al.* (2002) in their study of impact of nutrition education of Tamil Nadu. Integrated Nutritional Project on nutritional status of pre-school children found that glaring deficits in foods intake by target children was reflected before nutrition education, the deficits ranging between 30-77 percent. Nutrition education had an impact on food intake with special references to the consumption of cereals and vegetables. Deficits in milk and fresh food could not be reduced considerably which can be attributed to the prohibitive cost of these food items.

Geeta M. Yankanchi *et al.* (2002) concluded that incidence of malnutrition and morbidity among pre-school children was high. Their height and weight were lower than the values suggested that NCHS for these age groups.

Bhan and Kaur (2004) conducted a cross-sectional study on urban preschool boys to assess their nutritional status through anthropometric measurements. The results showed that height, weight, chest and head circumference of the sample were higher than ICMR standards for all age groups, while mid arm circumference was lower. Heights and weights were marginally lower than the 50th percentile of NCHS standards. Weight for age and mid arm circumference for age appeared normal.

Jyothilakshmi and Jamuna (2004) found that a child's overall development including health and nutritional status is solely/ wholly dependent

on her mother's health and nutritional status. Literacy status, awareness and economic status also affect the health of child. Improving women's nutritional status and empowering them with education, knowledge and economic position is very essential.

Kapur *et al.* **(2005)** studied the feeding practices, dietary intake and growth pattern of children, 9-36 months of age, in an urban slum of Delhi. The results showed that the intake of cereals, pulses, roots, green leafy vegetables, other vegetables, fruits, sugar, fats and oils among children was grossly inadequate. 'The nutrient intake for energy was 56 per cent of the current RDA. Anthropometrics analysis revealed that the children were grossly under nourished.
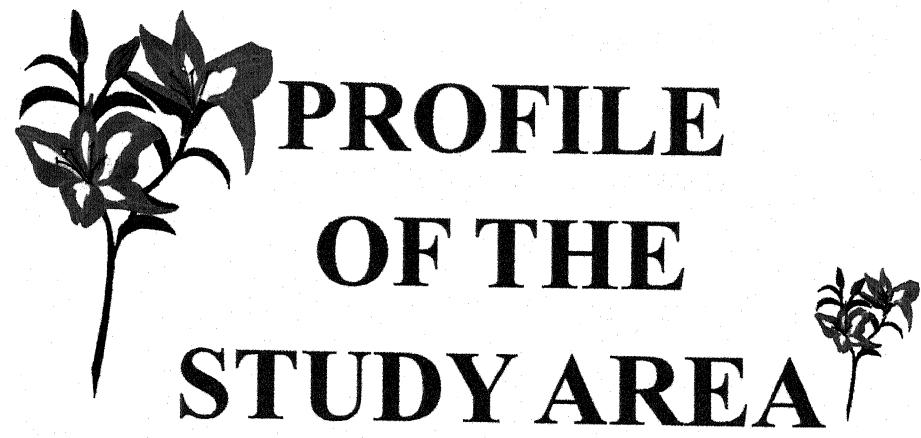
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PROFILE OF THE STUDY AREA

Chapter-III

PROFILE OF THE STUDY AREA

Prior to discuss the findings of the study, it is essential to sketch briefly the salient features of the study area. The following are the brief features of Shillong.

Shillong City

The 21st Jan., 1972 becomes an important landmark in the history of the state of Meghalaya, "The ABODS of Clowds" as coined by Dr. S.K. Chatterjee, Prof. Emeritus, become the 21st State of India Shillong, the capital of Meghalaya, according to legends, derived its name from a deity named Shyllong whose dwelling is also known as Shyllong Peak from whose neice, the Syiem (chief), clan of Khyrim, Mylliem, Maharram, Malaisohmat, Bhowal and Langrin Sprang up. Shillong is notably one of the finest hill station in India with a bracing climate throughout the year. It has numerous bridled path and is also one of the few hill station with motorable roads all around. Shillong has its own charm distinct from other hill stations, and present a beautiful, natural scenery dotted with a number of water falls and brooks.

Location

Shillong city is also the district headquarters of East Khasi hills, which is situated between $25^0 34'$ N latitude and $91^0 3'$ E longitude at an attitude of 1496 mts. above the sea level.

Area

The total geographical area is about 6436 sq.km. It is connected with Guwahati, the nearest railhead at a distance of 103 kms.

Population

According to the census 2001, the population of Shillong is 2,67,881 with the density of 4162 person/sq.km., having 63.31 per cent literacy rate.

Temperature and Rainfall

In summer, temperature during day time ranges from 21^0C to 33^0C while during winter minimum temperature reaches up to 8^0C. The rainfall ranges from 1191.10 mm to 2502.0 mm per annum with a relative humidity ranges from 58.12 to 89.16 per cent. Occasional hailstorms and strong winds are experienced during Feb. and March months.

Soil

Soil in general are sandy loam to loam, rich in humus, low in available phosphorus, have a tendency to become acidic, soil pH varies from 4.5 to 5.5.

Cropping pattern

A total of 15,408 (57.52 %) are cultivator families. They are following jhuming (shifting cultivation), which is covering an area of 299.6 sq km. Main season of crop production is March to November. Except in low-lying areas, no crops are grown during *rabi* season due to lack of moisture in soil. The crops in Boon include maize, paddy, millets, cucumber, watermelon, tapioca, muskmelon, chilli (bird's eye), turmeric, brinjal, sugarcane, sesame, pumpkin, ginger, banana, and papaya. The prevailing horticultural and plantation crops is Khasi mandarin, banana, passion fruit, pineapple, hatkora, guava, jackfruit, areca nut, tung, coffee, tea, teak and rubber. In *Kharif*, the production starts from May onwards, with the harvesting of vegetables etc. and end in November with the harvesting of paddy. Rice is the staple food of the people and majority of them are non-vegetarian. Rearing of pigs and backyard poultry is very common to

meet the demand of meat. Fish culture is also practiced in water bodies in limited scale.

About the slums

Total of 16 pockets of slum are existing in an around of Shillong city, as the target was to select 200 families, a cluster of 5 slums i.e. Mawprem, Mawkhar, Jhalupara, Lumdiengiri, Laban (40 families of each slums) were randomly selected for the determination of nutritive profile of pre-school going child. Christian with few families of Nepali mainly dominates in the slums, Assamies and Bengalees migrants who have either married a local lady of have settled in these areas. The children get recognition as members in the clan of their mother. List of notified and identified slums and existing families are as follows :

Table 3.1 List of notified and identified slums, number of families and demography of selected slums in Shillong

Sl. No.	Shillong city	Area of slum (km²)	No. of existing families	Population (person)	Male (person)	Female (person)	Children (Person)
1.	Mawprem	63.21	706	3518	897	1583	1038
2.	Malki	21.34	428	2581	1109	877	595
3.	Laitumkhrah	127.84	1556	6208	2275	2359	1574
4.	Lachaumiere	84.22	1415	8492	2694	2939	2859
5.	Laban	10.25	221	1503	460	482	561
6.	Mawlai	110.25	1443	7814	2435	2735	2644
7.	Lumdiengiri	56.26	907	5389	1728	1992	1669
8.	Jhalupara	64.23	1231	7314	2198	2801	2315
9.	Jaiwa	164.32	1338	7105	2061	2274	2770
10.	Rilbong	18.64	788	5782	2015	2431	1336
11.	Mawkhar	16.94	495	2500	777	945	778
12.	Nongthymmai	50.00	778	3415	1225	1147	1043
13.	Polo bazaar	19.11	195	1227	466	491	270
14.	Pynthorumkhrah	56.97	874	4218	1259	1898	1061
15.	Umpling	69.70	1421	6238	1965	2395	1878
16.	Rynjah	70.32	1390	6715	2154	2024	2537
	Total	1,003.6	15,186	80,019	25,718	29,373	24,928
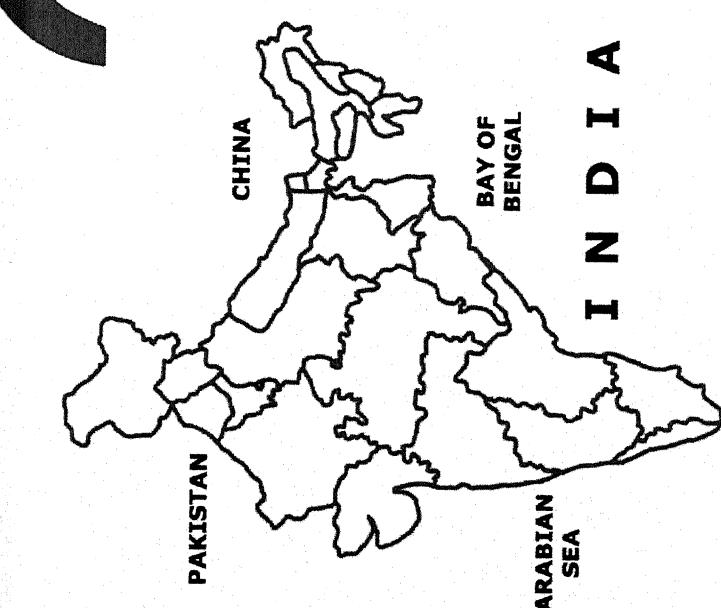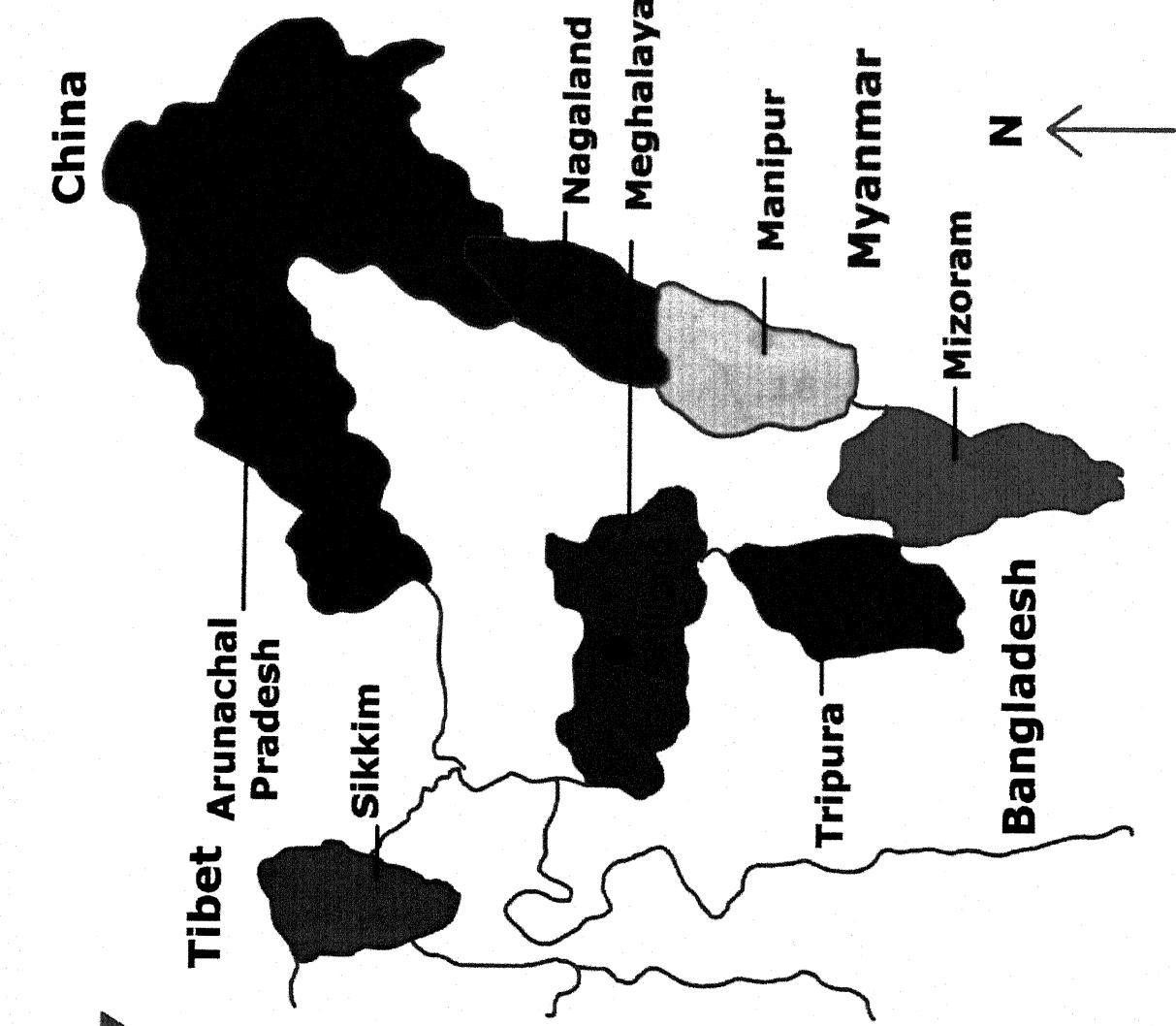
Location map of the study site in India
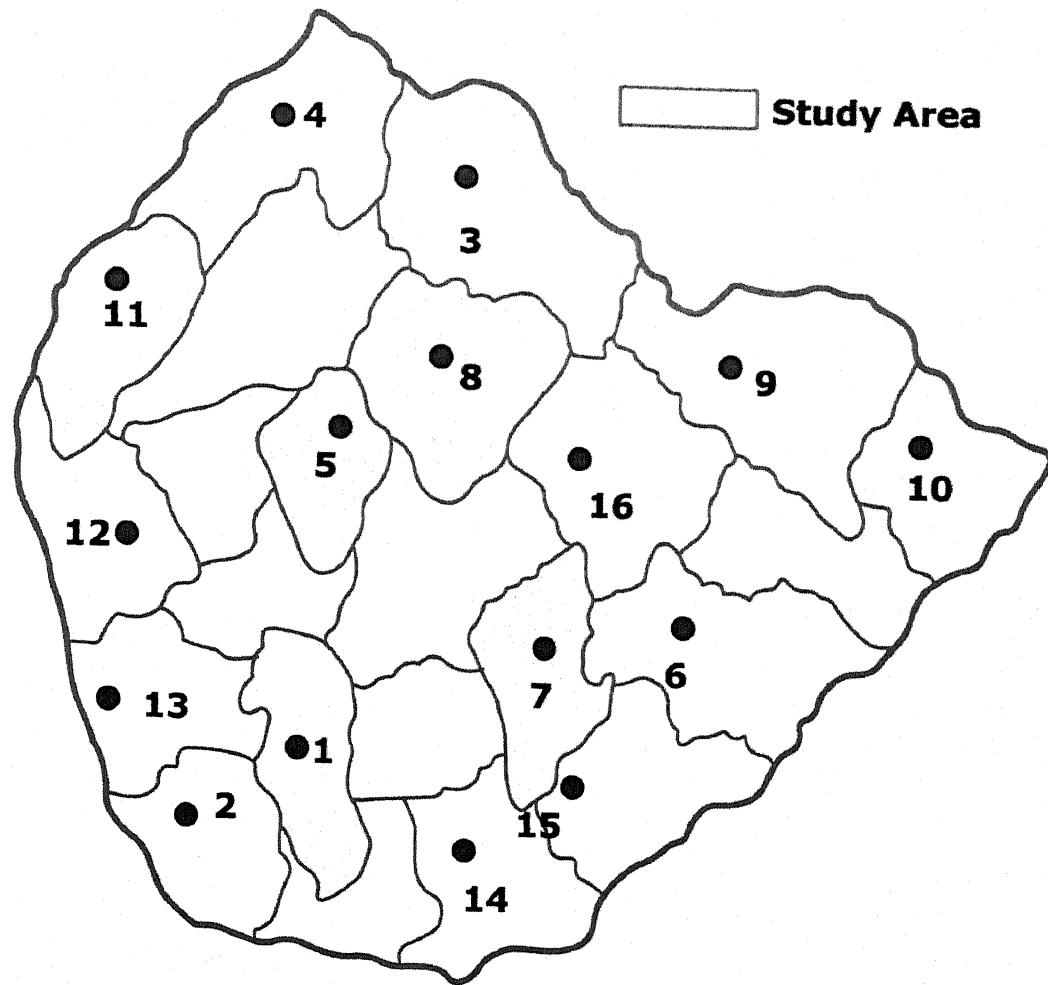
1. Mawprem
2. Malki
3. Laitumkhrah
4. Lachaumiere
5. Laban
6. Mawlai
7. Lumdiengiri
8. Jhalupara
9. Jaiaw
10. Rilbong
11. Mawkhar
12. Nongthymmai
13. Polo bazaar
14. Pynthorumkhrah
15. Umpling
16. Rynjah.

Position of Notified and identified slums in Shillong City

Map of Laban

N

Map of Jhalupara

N

Map of Mawprem

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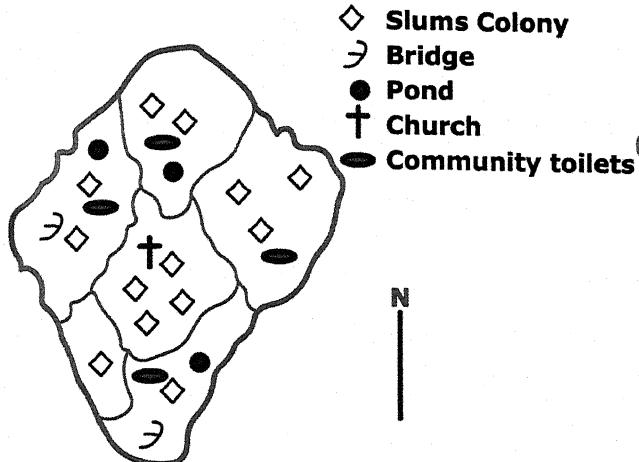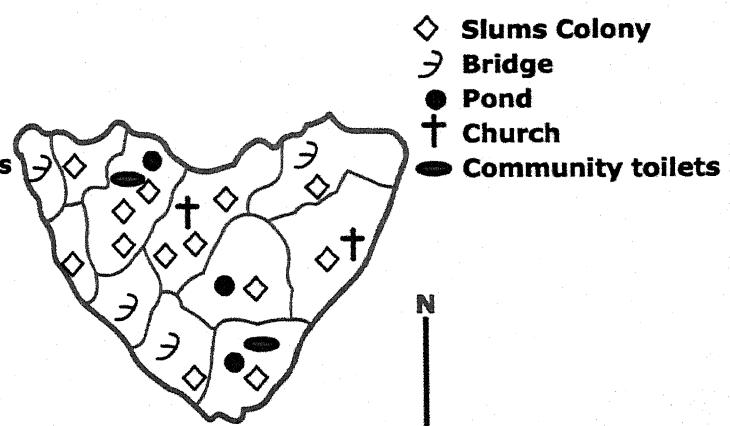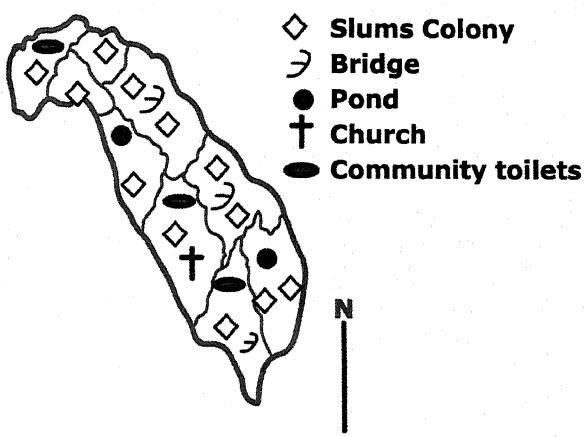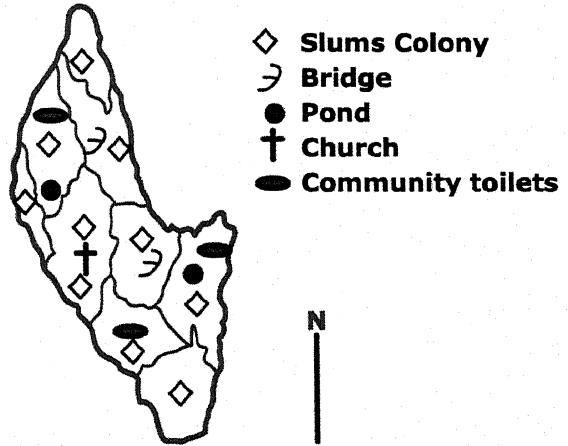
Map of Lumdiengiri

N

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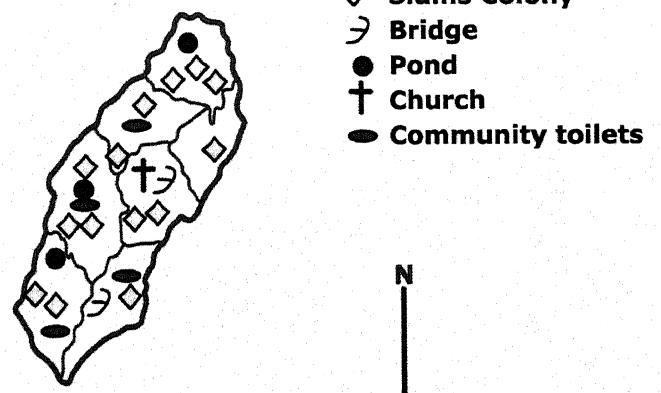
Map of Mawkhar

RESEARCH METHODOLOGY

Chapter IV

RESEARCH METHODOLOGY

For conducting research in any field or area, it is necessary to develop a systematic procedure for working. So that required information can be collected and also to guide the investigator in systematic analysis of the information, so that proper inferences can be made.

Methodology includes techniques, devices and procedures applied for conducting the survey. Keeping this in mind, the following methodology has been developed prior to actually taking up the research work in the field. The investigator selected the survey topic, "Dietary profile of pre-school children of slum dwellers of Shillong city in Meghalaya state". For this purpose a questionnaire was designed in consultation with Dr. Neelma Kunwar, who was my guide. The research of any study may be generalizable when the methodology is to be designed in specified manner.

Selection of the area

The area selected for the present investigation was slums of Shillong city. It has 16 pockets of slums having 1,003.6 sq.km. area, in which 15,186 number of families are existing with 24,928 number of children. Out of 80,019 person (population). The study was confined to 200 preschool children situated in 5 different slums of Shillong.

Period of Investigation

The data collection was initiated during June, 2004 and it continued till March, 2005. Thus, the data collection took about 10 months time.

Selection of the sample

After selecting the slum pockets, the selection of number of sampling units was done. Sample of the study consists 200 preschool children of 0-6 years of age (40 children each from 5 slums). It was a purposive sampling. The samples were selected randomly.

Procedure of data collection

A pilot study was conducted on 5 families, from the selected slum area with the objective to know whether the schedule helps in collecting required information and is free of any ambiguity and complexity. Certain modifications were made and then the pre-tested schedule was developed to collect the information from the selected subjects.

Collection of data

The primary tools used in the study was a detailed proforma. Personal interview method was used to collect the data. For this purpose, a schedule was developed with the help of advisor.

"A schedule is usually applied to a set of questions which are asked and filled in by the interviewer in a face to face contact" (Elhance., 1995).

The schedule consisted of two parts :

1. General Information

2. Specific Information

General Information consisted of information regarding name, age, education, caste, religion, occupation, income, size of family, house number, no. of rooms, type of house, facilities at home, duration of residence and food habits.

The **specific information** consisted of four sections ie. A, B, C, and D.

Section: A related to know the hygienic conditions in the homes and the proper living in the slums.

Section: B related to food consumption habits, dietary intake and nutritional intake etc. This section had a chart for recording dietary intake of the pre-school children, in which the nature and quantity of each food consumed in past 24 hours was recorded in household measures. This section also had another table, which showed their daily nutrient intake in comparison with Recommended Dietary Allowances (RDA) given by ICMR.

Section: C related to anthropometric measurement and clinical survey. and

Section: D related to sources of nutrition education.

In the schedule, the question were structured with listing alternative answer. The respondent had to choose the appropriate one according to their choice. Prepared questionnaire is shown in appendix I.

The question regarding the general and specific information was asked from the respondent by the investigator herself. Firstly the data related to general characteristic were obtained. Then the detailed specific information related to food consumption habits, dietary intake, nutritional intake, clinical symptoms etc. were obtained.

The data related to the consumption of various food items were obtained. For this purpose 24 hours recall method was used in the sense that respondents were advised to provide information on the consumption of various food items of their pre-school child of the day prior to the day of the survey. Dietary recall data was not collected after the day of any occasion or fasting. Showing them standard cups made the standardization and bowls and then they were asked that how many cups of the food their child have consumed. In this context the data on the amount of various food items were obtained, which were later on converted into the form of raw material. It is to be mention here that it is quite

difficult to measure the consumption of various food items very accurately because the respondent themselves were not having any accurate records and the information provided by them may be considered only as approximate one.

To calculate the energy, protein and fat, we used Comprehensive Food Exchange List; the amount of food in household measures was converted into metric weight and the nutrient intake was calculated according to the RDA (ICMR, 1990).

Table 4.1 Weight and their equivalent measures

Food Stuff	Measure	Weight (g)
Milk	1 C	250 ml
Meat	1 egg	40
Pulse	3 T	30
Cereal	1 bread slice	20
Vegetable B	-	Variable
Fruit	1 portion	Variable
Fat	1 t	5
Sugar	1 t	5

Then the various anthropometric measurements were taken for the pre-school age children and they were examined clinically for the presence of any nutritional deficiency signs.

Anthropometric measurements

The pattern of growth and the physical study of the body though genetically determined are profoundly influenced by diet. Hence, anthropometric measurements are useful criteria for assessing nutritional study.

(a) Weight

Weight is the simplest measurement of growth and nutritional status. A weighing balance was used, which was adjusted to zero before measurement of each subject. Subject was made to stand straight ahead without touching anything. His height was recorded to the nearest 0.25 kg (Gopal Das, T. *et al.,* 1987).

(b) Height

For the height measurement measuring tape was used. Measuring tape was fixed on smooth wall. It was perpendicular to the ground, while floor was rough or smooth. The subject was ahead to remove his/her shoes, stand with the center his back touching the scale, with his/her feet parallel and heels, shoulders and back of the head touching the wall. The head was held comfortably erect. A smooth ruler was held on top of the head in the center, crushing the hair at right angle to the scale and the height read off from the lower edge of the ruler to the nearest 0.5 cm (Gopal Das, T. *et al.,* 1987).

(c) Mid upper arm circumference

The fiber glass tape was used for measurement of mid upper arm circumference with a minimum division of 0.1 cm. The subject was asked to flex his left arm at the elbow such that the lower arm at a right angle to the upper arm. The length between the acromian process of the scapula and oleranon process of the ulna was measured with a flexible fibre glass tape and the site of measurement exactly midway down the upper arm. The arm circumference was measured to the nearest 0.1 cm (Gopal Das, T. *et al.,* 1987).

(d) Head circumference

Head circumference is related to mainly brain size to small extend, to thickness of scalp tissues and the skull. The subject was asked to stand in a

steady position and circumference was measured by placing the flexible and non-stretchable measuring tape firmly sound the frontal bones just superior to supra orbital ridges; passing it round the head at same level on each side. Measurement was noted to the nearest 0.1 cms (Jellife, 1966).

(e) Chest circumference

It is also one of the indicator for measuring nutritional status of the child (Swaminathan, M. 1991). The subject was made in the standing position with their palms inverted in the axile. Measurement was taken with a flexible and non-stretchable measuring tape the nipple line, preferably in mid inspiration, measurement was taken to the nearest 0.1 cm (Jellife, 1966).

Clinical examination

Clinical examination is the most essential part of all nutritional surveys, since the ultimate objective is to assist levels of health of individuals and population groups as influenced by the diet they consume. All the symptoms were compiled and examined including hair, eyes, teeth, nails, gums, skeletal system, lower eyelid as well as general appearance (Swaminathan., 1991).

Nutrition education

The importance of nutrition education as a means for improving the nutrition of the community in developing countries has been increasingly realised during recent years. Lack of knowledge of dietary requirements and the nutritive value of different foods is the main contributory cause for the widespread occurrence of malnutrition among preschoolers. Nutrition education should be practical and adopted to suit the socio-economic conditions, food habits and local food resources. It should include effective demonstration feeding in which mothers take active part.

Tabulation and statistical analysis

"Statistical analysis are procedure used in finding out the numerical value of the whole study".

The data was put to further statistical analysis in order to draw meaningful conclusion. Percentage, mean, deficit percentage, standard deviation, correlation coefficient were used.

Percentage

Single comparisons were made on the basis of the percentages. For drawing percentages, the frequency of a particular cell was multiplied by 100 and divided by total number of respondents in that particular category to which they belonged.

Arithmetic mean

Arithmetic mean is the average used in the present study.

"Arithmetic mean of a series is the figure obtained by dividing the total values of various items of their number" (Elhance, 1995).

$$\overline{X} \quad = \quad A + \frac{\sum f_u}{\sum f_i} \times i$$

where,

$\overline{X}$ = Arithmetic mean

A = Assumed mean

$\sum f_u$ = Product of frequency and deviation taken from the assumed mean

i = Class interval

$\sum f$ = Total frequency

Deficit percentage

For drawing deficit percentage, nutrient intake was subtracted with RDA, multiplied by 100 and divided by RDA.

$$= \frac{RDA - \text{nutrient intake}}{RDA} \times 100$$

Standard Deviation

Concept of standard deviation was first used by Karl Pearson in 1893. It is defined as a positive square root of arithmetic mean of the square of deviation of the given observations from their arithmetic mean. It is denoted by the Greek letter (read as sigma) (Elhance, 1995).

$$\sigma x = \sqrt{\frac{\sum f - (x - \bar{x})^2}{(n-1)}} \quad \text{if } n < 30$$

$$\sigma = \sqrt{1/n \sum f (X_i - \bar{X})^2} \quad \text{if } n > 30$$

where, $\bar{X} = \dfrac{\sum fx}{n}$ is the arithmetic mean of the given value

Correlation coefficient (r)

Karl Pearson has given the formula for its calculation. The coefficient of correlation two variable is obtained by dividing the sum of the products of corresponding deviations of the various items of the two series from their respective means by the products of their standard deviations and the number of pairs of observation.

The coefficient of correlation or the product moment correlation is calculated by the following formula :

$$r \frac{n\Sigma \ \Sigma fuv - \Sigma fu \ \Sigma fv}{\sqrt{[n \ \Sigma fu^2 - (\Sigma fu)^2] [n \ \Sigma fv^2 - (\Sigma fv^2]}}$$

where, r stands for correlation coefficient

n = number of observations

$\Sigma\Sigma fuv$ = Sum of the product of deviation of x and y variables with their frequencies

Σfu = Sum of the product of deviation of x variable with the frequency

Σfv = Sum of the product of deviation of y variable with the frequency

Σfu^2 = Sum of the product of squares of deviation of x variables with the frequency

Σfv^2 = Sum of the product of squares of deviation of y variable with the frequency.

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FINDINGS
AND
DISCUSSION

Chapter-V

FINDINGS AND DISCUSSION

The empirical results and its discussion have been presented in this chapter. In the present study 200 households were selected through three stage random sampling technique. The data collected was discussed in various tables. For the purpose of convenience, the presentation has been sub-divided under the following heads :

I.   Socio-economic profile.

II.   Observations related to dietary intakes and nutritional assessment of children.

III.   Observations related to anthropometric measurements.

IV.   Observations related to clinical observations.

V.   Observations related to nutrients intake.

VI.   Observations related to malnutrition.

VII.   Observations related to nutrition education.

I. Socio-economic profile

(a) Age

Table 5.1 Age-wise distribution of respondents

Age group (years)	Frequency	Per cent	Range
Up to 2	7	3.5	1.49 ± 0.32
2 – 4	108	54.0	2.85 ± 0.49
4 – 6	85	42.5	4.40 ± 0.53
Total	200	100.0	3.46 ± 0.98

Age-wise distribution of children shows that 54.0 per cent children were 2 to 4 years age group followed by 42.7 per cent children were in 4 to 6 years age

group. Minimum 3.5 per cent children were belonged to up to 2 years age group. More variation was found in 4 to 6 years age group (Table 5.1).

(b) Occupation

Table 5.2 Distribution of the respondents according to mother's occupation

Mother's occupation	Frequency	Per cent
Agriculture	45	22.50
Business	115	57.50
House wife	25	12.50
Labour	13	6.50
Sweeper	2	1.00
Total	200	100.00

It is evident from the Table 5.2 that distribution of respondents according to mothers' occupation maximum 57.50 per cent respondents' mothers were doing business and 22.50 per cent children respondents' mother were in agriculture profession. Minimum 1.00 per cent children's mothers were doing profession as a sweeper.

(c) Education

Table 5.3. Distribution of the children respondents according to mother's education

Mother's education	Frequency	Per cent
Illiterate	35	17.50
Up to Primary	47	23.50
Secondary	93	46.50
High School & above	25	12.50
Total	200	100.00

Table 5.3 indicates that 82.50 per cent respondents were observed to be literate and only 17.50 per cent illiterate. The educational standard of literates in descending order was found as secondary (46.50 %), up to primary (23.50 %)

and high school and above (12.50 %). Hence, it was concluded that there was more difference between formally literate and illiterate respondents.

(d) Income

Table 5.4 Monthly family income-wise distribution of respondents

Income	Frequency	Per cent
Up to Rs. 3200	36	18.00
Rs. 3200 – Rs. 3500	19	9.50
Rs. 3500 and above	145	72.50
Total	200	100.00

Table 5.4 reveals that maximum 72.50 per cent respondents were belonged to Rs. 3500 & above monthly family income and 18.00 per cent respondents family monthly income were up to Rs. 3200. Minimum 9.50 per cent respondents have family monthly income Rs. 3200 to Rs. 3500.

(e) Caste

Table 5.5 Caste-wise and income group-wise distribution of the respondents

Income group	Caste	
	Christian (SC)	Hindu OBC
Up to Rs. 3200	36 (18.37)	-
Rs. 3200 – Rs. 3500	19 (9.69)	-
Rs. 3500 and above	141 (71.94)	4 (100.0)
Total	196	4 (100.0)

Table 5.5 reflects that caste-wise and income group wise distribution of the respondents 71.94 per cent Christian SC respondents were have family monthly income Rs. 3500 and above and 18.37 per cent SC respondents monthly family income up to Rs. 3200. Cent per cent OBC respondents monthly family income Rs. 3500 & above.

(f) Type of house

It was observed from Table 5.6 that 83.00 per cent of respondents resided in mixed type of house and 17.00 per cent in Kachcha houses. This shows that maximum respondents were possessed mixed type of house.

Table 5.6 Distribution of respondents according to type of houses

Type of house	Frequency	Per cent
Kachcha	34	17.00
Mixed	166	83.00
Total	200	100.00

Table 5.7 Distribution of the sample according to knowledge regarding personal hygiene

S. No.	Parameters	Category	Percentage
1.	Surroundings	Satisfactory	60
		Good	10
		Fair	130
2.	Ventilation	Satisfactory	100
		Good	95
		Fair	5
3.	Do you take bath daily	Yes	120
		No	80
4.	Do you wash clothes daily	Yes	117
		No	83
5.	Do you clean your house daily	Once	140
		Twice	60
6.	How many times in a month you cut your nails	Once	70
		Twice	110
		Trice	20
7.	Do you clean your hands before meals	Yes	145
		No	55

It is apparent from the data depicted in Table 5.7 that 130 per cent of the people of the slum have fair surroundings, 60 per cent had satisfactory and 10 per cent had good surroundings. In relation to ventilation, 100 per cent had

satisfactory, 95 per cent had good and 5 per cent had fair ventilation. 120 per cent results were found in daily bath and 117 per cent were wash clothes daily. In case of cleaning the house daily, 140 per cent of them clean the house once a day and rest 60 per cent twice a day.

70 per cent of them cut their nails once in a month, 110 per cent twice in a month and rest 20 per cent cut their nails thrice in a month or when required. Majority (145 %) clean their hands before having their meals and 55 per cent do not do so. Hence, we can conclude from this table that these people live in good hygienic conditions and have satisfactory hygiene habits.

11. Nutrient intake by Children

Life cannot be sustained without adequate nourishment. Child needs adequate food for growth, development and to lead an active and healthy life. Dietary habits of populations in different regions of the world have been determined mainly by the availability of foods locally and local practices. Man has evolved his habitual dietary pattern to maintain good health, perhaps after a good deal of trial and error. Satisfaction of hunger is usually the primary criterion for adequate food intake, but satisfaction of hunger itself is not a safe guide for the selection of proper foods. For sustaining healthy and active life, diets should be planned on sound nutritional principles. Human life needs a wide range of nutrients to perform various functions in the body and to lead a healthy life. The nutrients include proteins, fat, carbohydrates, vitamins and minerals. The foods containing these nutrients which human body consume daily are classified as cereals, legumes (pulses), nuts and oilseeds, vegetables, fruits, milk and milk products and flesh foods. Most foods contain almost all the nutrients in various proportions. Protein, fat and carbohydrate are sometimes oxidized in the body to yield energy, which the body needs. Vitamins and minerals do not

supply energy but they play an important role in the regulation of metabolic activity in the body and minerals also used for the formation of body structure and skeleton.

Human body requires a wide range of nutrients to keep it healthy and active. One of the aims of nutritional research is to determine physiological requirements of various nutrients by different age and sex groups. Expert committees of different countries examine the available information on nutrient requirements and the national food habits and arrive at what is normally called Recommended Dietary Allowances (RDA). The consumption of any food or drink which provided energy, protein, fat, carbohydrate, Fe, Ca, vit. A, vit. B and vit. C based on a 24 hrs recall technique, giving an average eating frequency daily.

In diet, daily food intake was mostly cereals, leafy vegetable, roots and tubers. Other vegetable, milk, sugar and jaggery were consumed twice in week.

Table 5.8 Average food consumption of the families per day in the studied population

Food stuff (gms)	Recommended by ICMR		Taken		t	P
	Mean	SD	Mean	SD		
Cereals	1968.40	582.67	1853.33	573.52	1.407	> 0.05
Pulses	395.15	114.99	247.75	94.33	9.911	< 0.01
Green vegetables	582.00	188.25	422.57	162.54	6.410	< 0.01
Other vegetables	523.80	196.94	415.22	123.26	4.673	< 0.05
Fruits	338.40	152.76	246.31	98.44	5.067	< 0.01
Milk	2001.50	911.99	1235.28	367.92	7.791	< 0.01
Fats and oils	194.50	65.58	108.33	50.13	11.513	< 0.01
Meat and eggs	195.70	51.64	51.23	48.55	20.383	< 0.01

Table 5.8 shows the comparison of food consumption and recommended mean intake per family per day by the ICMR group. It indicates that the cereals consumed are lesser than the recommendations of ICMR statistically insignificant mean difference was observed between recommended cereals and cereals consumed by the families in the slum.

Pulses consumption was also less in slums as compared to recommendations by ICMR. Statistically significant mean difference was observed between the pulses consumed by families in slum and those recommended by ICMR. Green vegetables, consumption was also less as compared to recommendations of ICMR. Statistically significant mean difference was observed between vegetables recommended by ICMR and those consumed by families.

Likewise consumption of other vegetables, fruits, milk and fats and oils were less than the recommendations of the ICMR. Statistically significant mean differences were observed between the recommended allowances and those consumed by families.

Arokiasamy and Rao (1994) in their study of dietary practices and nutritional status of rich and poor observed the similar results.

Table 5.9 Distribution of the comparison of mean protein intake of the sample according to age group

Age group (years)	Frequency	Protein intake (g)	SD	r	RDA (g)	Deficit per cent
Up to 2	7	24.96	2.69	+0.4619	22	-13.5
2 – 4	108	25.06	2.35	0.1132	26	3.6
4 – 6	85	24.43	2.42	0.1453	30	18.6
Total	200	24.79	2.42	0.2131		

Table 5.9 shows that mean protein in take of the sample according to age group of the children respondents, proteins are the important constituent of
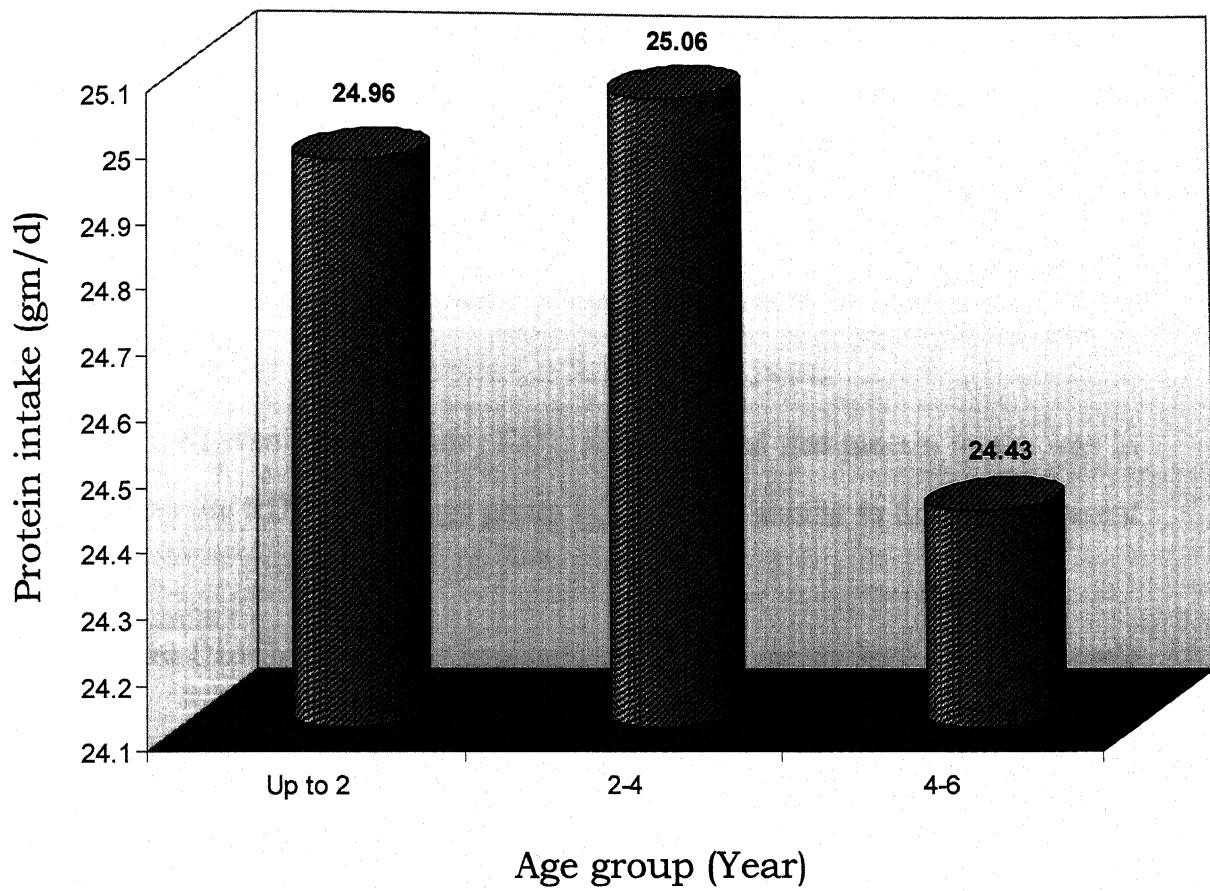
Fig. 5.1: Distribution of children according to mean protein intake

tissues and cells of the body. They form the important component of muscle and other tissues and vital body fluids like blood. The protein in the form of enzymes and hormones was concerned with a wide range of vital metabolic process in the body. Protein as antibodies helps the body to defend against infection. The protein in the diet most economically used for the formation of body, protein to fulfill other functions essential to life. Maximum protein intake (25.06 g) of the children respondents were having 2 to 4 years age group and variation of the protein intake was found to be almost same and the coefficient of correlation (0.2131*) was significant at 5 per cent level of significance conclude that according to age the protein intake of the respondents were increases. 18.6 per cent protein intake of the respondent deficit in 4 to 6 years.

Amirthaveni and Barikor (2002) also observed that protein intake was in excess than the RDA for the age group 1-3, which is similar to finding of present study.

Table 5.10 Distribution of the comparison of mean energy intake of the sample according to age group

Age group (years)	Frequency	Energy intake (K Cal)	SD	r	RDA (K Cal)	Deficit per cent
Up to 2	7	1046.07	92.47	0.1774	1240	15.6
2 – 4	108	1165.99	94.57	0.3852	1420	17.9
4 – 6	85	1472.15	82.84	0.3925	1690	12.9
Total	200	1291.91	110.47	0.3643*		

The perusal of the Table 5.10 reveals that distribution of the respondents according to energy intake, age-wise the maximum 1472.15 (K Cal) average energy of the children respondents were having 4 to 6 years age group followed by 1165.99 (KCal) energy intake of the children respondents belonging to age group 2 to 4 years. Maximum variation 94.57 was found in age group 2 to 4
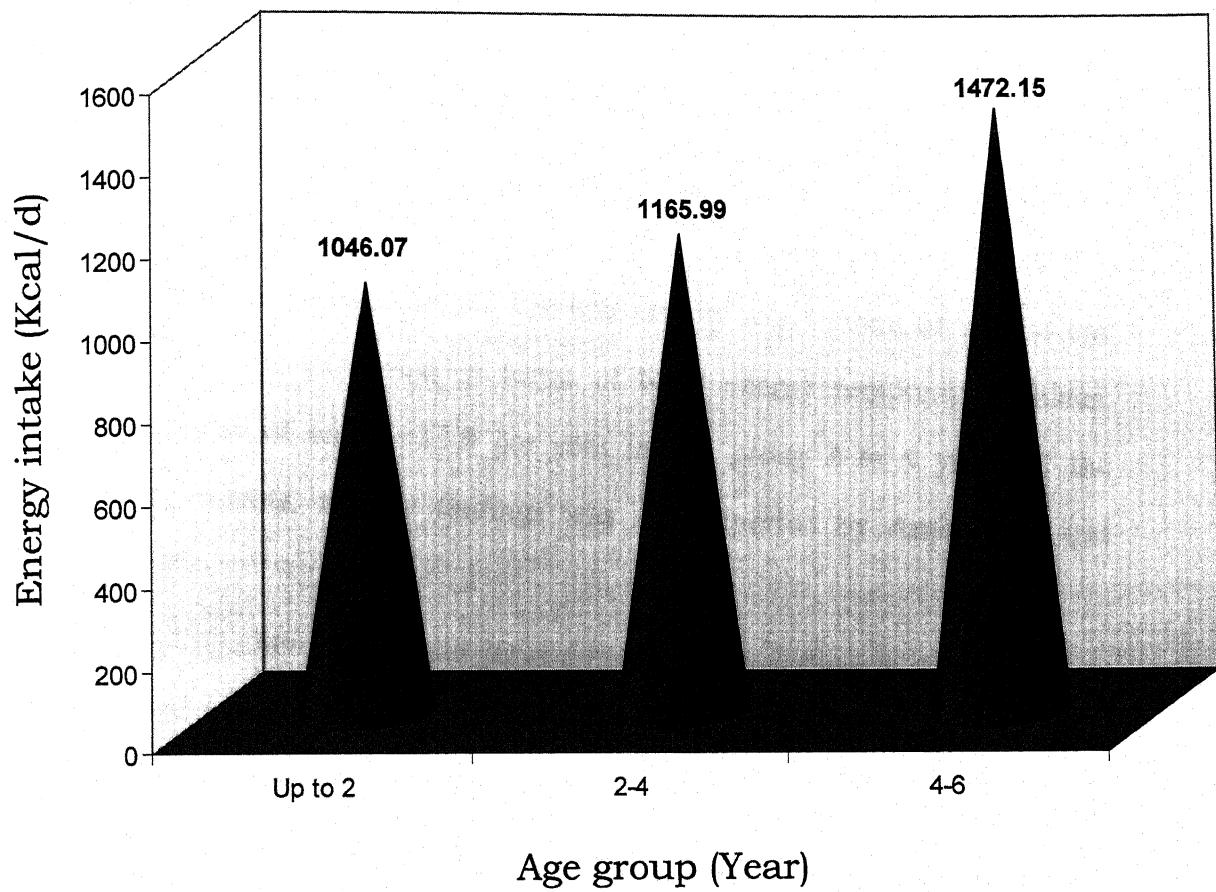
Fig. 5.2: Distribution of children according to mean energy intake

years. The observed value (0.3852*) of correlation was significant in 2 to 4 years and the value (0.3925*) significant in 4 to 6 years. The correlation coefficient (0.3643*) was significant at 5 per cent level of age group and energy intake of the children respondents, concluded that according to age, energy intake of the respondents was increases.

The three components of foods, which provided the energy carbohydrate, fat and protein. The total energy requirement of an individual was made up of two main components (a) basal or resting energy requirement for such vital functions as respiration, circulation etc (b) the energy required for the actual physical activity of the individual. The total energy requirement of various age groups can also be expressed in terms of basal energy requirement values. Maximum deficit of energy 17.9 per cent in age group 2 to 4 years of the children respondents. Similar findings was also reported by Amirthveni and Barikor (2002).

Fat is important of diet and serve a number of functions in the body. It is a concentrated source of energy and it supplies per unit weight more than twice the energy furnished by either protein or carbohydrate. Presence of fat in the diet is important for the absorption of fat-soluble vitamins like vitamin A and carotene present in the diet. Fat oxidized in the body cells to supply the energy, the body uses all the time the great concentration of energy in fat.

Table 5.11 Distribution of the comparison of mean fat intake of the sample according to age group

Age group (years)	Frequency	Fat intake (g)	SD	r	RDA (g)	Increase per cent
Up to 2	7	38.11	4.70	0.6029	25	52
2 – 4	108	39.16	4.89	0.0978	25	57
4 – 6	85	38.68	4.31	0.2467	25	55
Total	200	38.28	4.73	0.2194		
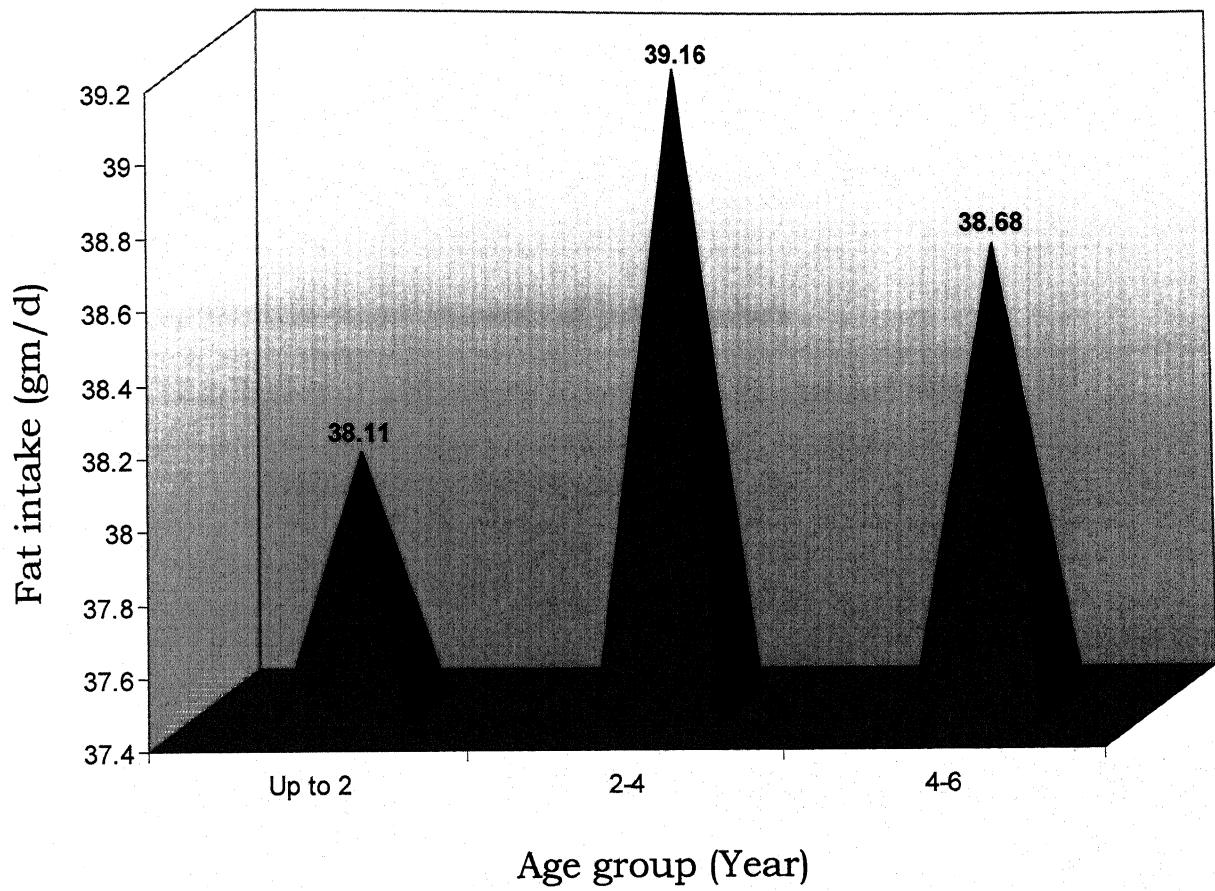
Fig. 5.3: Distribution of children according to mean fat intake

Table 5.11 shows that distribution of children respondents according to fat intake age wise that 39.16 g fat intake of the respondents were having age 2 to 4 years and 38.68 g fat intake in 4 to 6 years age group, maximum variation 4.89 in 2 to 4 years age group the correlation coefficient was significant at 5 per cent level of significance between fat intake of the respondents and age group. According to age group the fat content of the respondents were increases. The fat content of the children respondents in all age group were more to compare with RDA. Most of the mothers were given rich diet like non-veg and butter to her children.

III. Anthropometric measurements of preschoolers

Table 5.12 Distribution of respondents according to age wise and height

Age-group (Year)	Frequency	Height (cm)	SD	r
Up to 2	7	76.29	4.99	+0.4407*
2 – 4	108	91.44	7.27	0.2863*
4 – 6	85	100.17	10.08	0.1117
Total	200	94.62	10.12	0.5357*

Table 5.12 indicates that maximum average height (100.17 cm) of the respondents were in 4 to 6 years age-group followed by (91.44 cm) height were in 2 to 4 years age-group. The maximum standard deviation (10.08) in 4 to 6 years age group and 7.27 in 2 to 4 years age-group that concluded more height variation of the respondents were found in 4 to 6 years age-group. Over all average height 94.62 cm of the respondents, and correlation coefficient between height and age-group of respondents was 0.5357* significant at 5 per cent probability level conclude that according to age, height of the children respondents were increases. Nirojini and Kaur (2004) were also reported the similar findings.
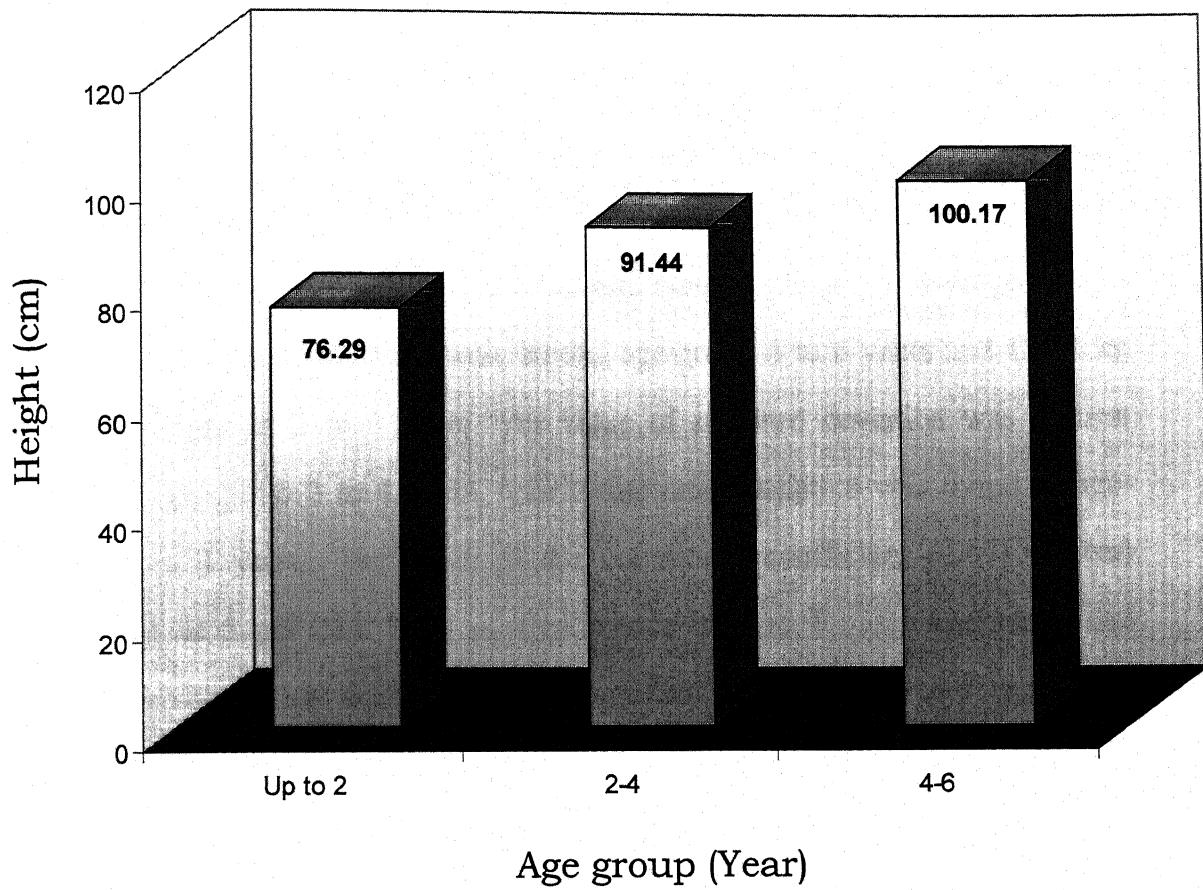
Fig. 5.4: Distribution of children according to their height

Table 5.13 Distribution of respondents according to age wise and weight

Age-group (Year)	Frequency	Weight (kg)	SD	r
Up to 2	7	10.64	0.60	-0.0308
2 – 4	108	13.44	2.46	0.4713*
4 – 6	85	16.91	1.71	0.4265*
Total	200	14.82	2.83	-0.7379*

Weight is a commonly used indicator of body size, and it reflects the level of food intake. Weight deficiency appears to the best indicator of prevalence of PEM in the children of all age groups. It is clear from the Table 5.13 that distribution of the respondents age-wise and weight, maximum average weight (16.91 kg) of the respondents were having age-group 4 to 6 years and 13.44 kg average weight in 2 to 4 years. The value of standard deviation was highest (2.46) in age-group 2 to 4 years, reason that more variation was found in age-group 2 to 4 years. The value of the correlation coefficient (0.4713*) was significant at 5 per cent level of significance in 2 to 4 years age group and (0.4265*) correlation coefficient was significant in 4 to 6 years age-group, concluded that age of the respondents was increases then weight were also increases. Overall average weight of the respondents (14.82 kg) and correlation between age-wise and weight (0.7379*) significant at 5 per cent level of significance. The same results are in conformity with that of Nirojini and Kaur (2004).

Table 5.14 Distribution of respondents according to age-wise and mid upper arm circumference

| Age-group (Year)	Frequency	Mid upper arm circumference (cm)	SD	r
Up to 2	7	11.98	2.11	+0.4235
2 – 4	108	15.32	2.43	0.4894*
4 – 6	85	18.94	10.02	+0.0262
Total	200	16.74	7.05	0.2787*
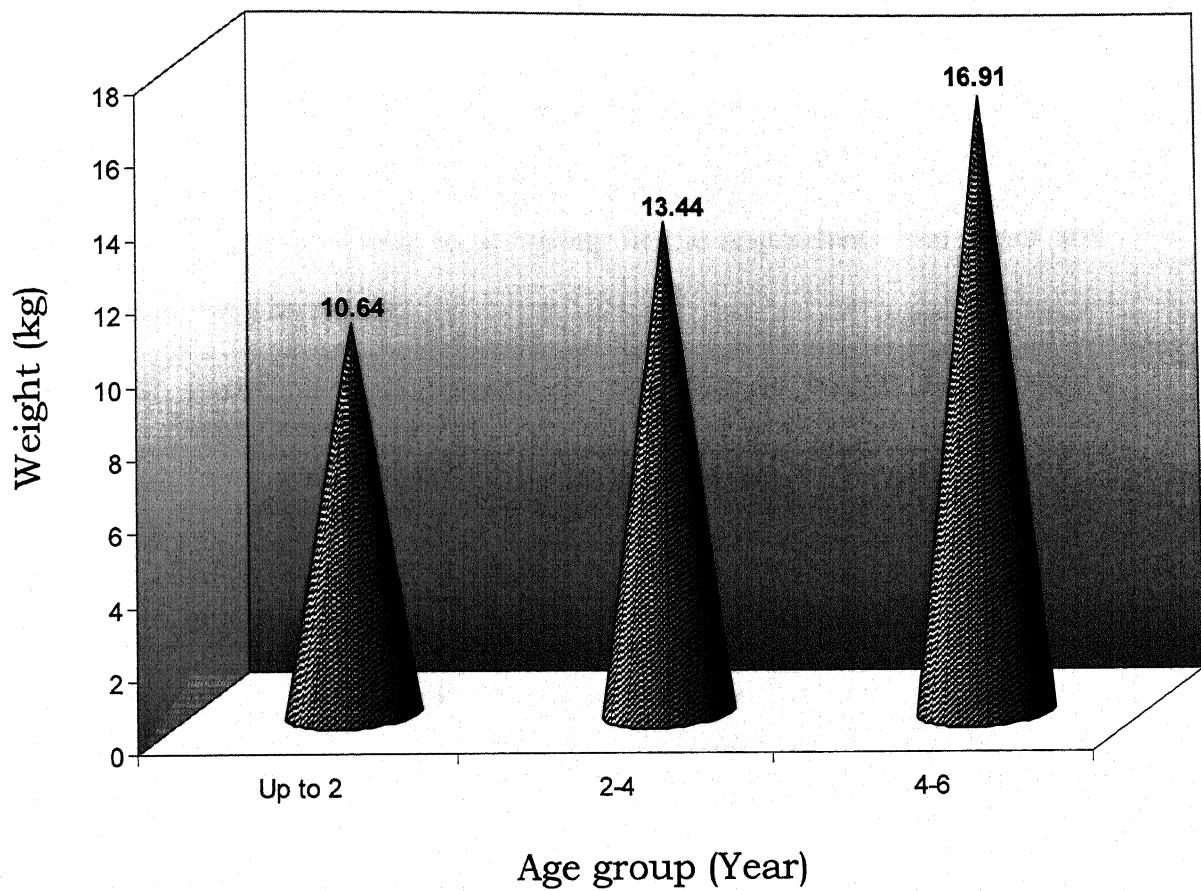
Fig. 5.5: Distribution of children according to their weight

Table 5.14 shows that distribution of the children respondents according to age and mid upper arm circumference that maximum average mid upper arm circumference (18.94 cm) of the children respondents were in 4 to 6 years age-group followed by 156.32 cm in 2 to 4 years age-group. More variation (10.02) was found to be in 4 to 6 years age-group. Average mid upper arm circumference (16.74 cm) of the children respondents from all age-group. Correlation coefficient (0.2787*) between mid upper arm circumference and age-group of the children respondents was significant at 5 per cent probability level conclude that according to age-group of the respondents mid upper arm circumference was increases.

Table 5.15 Distribution of respondents according to weight and mother's occupation

Occupation	N	Weight (kg)	SD
Agriculture	45	14.24	2.96
Business	115	14.85	2.83
Housewife	25	15.23	2.72
Labour	13	15.59	2.69
Sweeper	2	16.40	1.98
r	0.0713		

Table 5.15 shows that sweeper mother's children average weight 16.40 kg and labour mother's children have average weight 15.59 kg. The correlation coefficient was found to be non-significant between weight of the children and occupation of the mother.

Table 5.16 shows that distribution of respondents according to mid upper arms circumference and mother's occupation, house wife mother's her children mid upper arms circumference (16.40 cm). 16.37 cm mid upper arms circumference of respondents his mother's occupation labour class. The value of correlation coefficient was non-significant at 5 per cent level of significance.
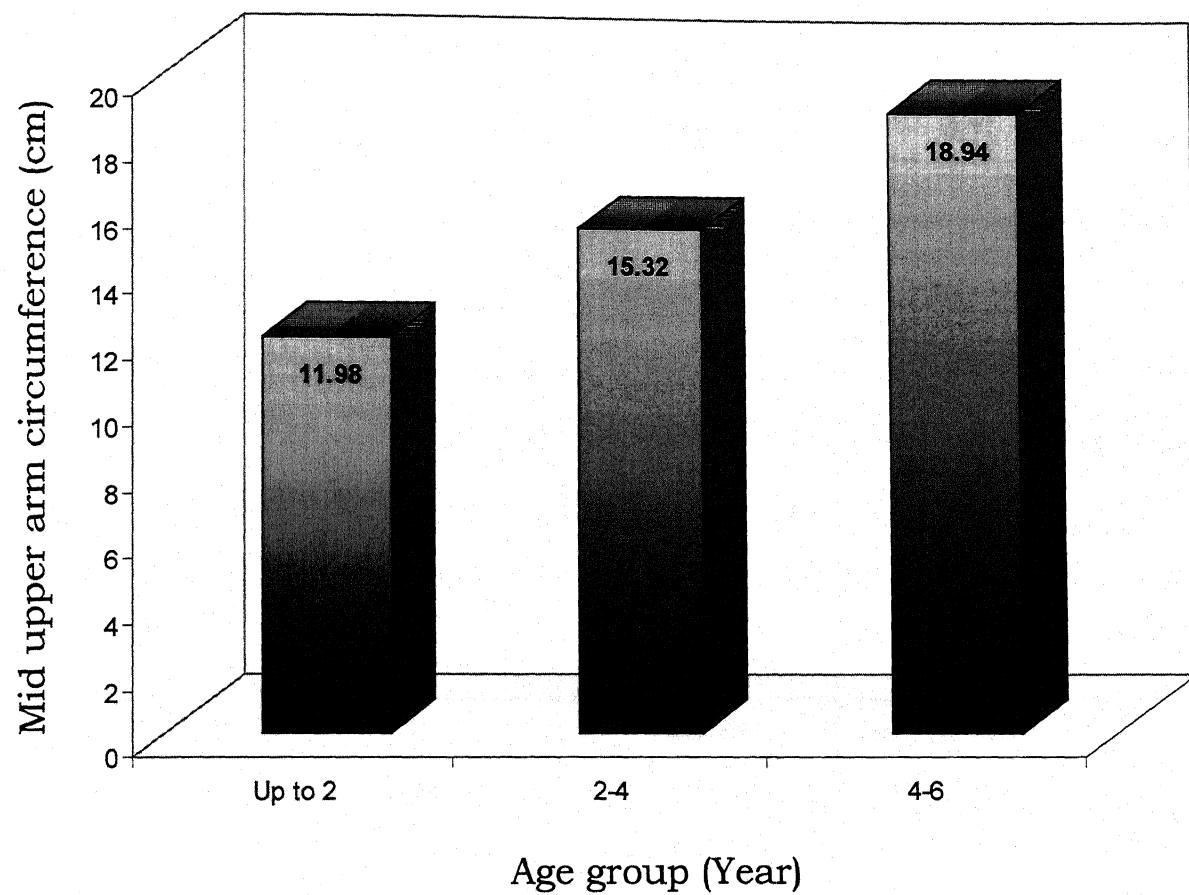
Fig. 5.6: Distribution of children according to their mid upper arm circumference

Table 5.16 Distribution of respondents according to mid upper arm circumference and mother's occupation

Occupation	N	Mid upper arm circumference (cm)	SD
Agriculture	45	16.16	2.69
Business	115	16.23	2.59
Housewife	25	16.40	2.99
Labour	13	16.37	2.24
Sweeper	2	16.50	0.71
r		0.0368	

Table 5.17 shows that labour class mother's occupation of her children energy intake maximum (1341.92 KCal) followed by agriculture occupation of mother's child energy 1282.73 KCal. The correlation coefficient was non-significant at 5 per cent level of significance.

Table 5.17 Distribution of respondents according to energy intake and mother's occupation

Occupation	N	Energy (KCal)	SD
Agriculture	45	1282.73	187.69
Business	115	1297.20	175.00
Housewife	25	1262.32	189.41
Labour	13	1341.92	189.08
Sweeper	2	1238.75	198.15
r		0.0261	

Table 5.18 indicates that business class women of her children taken maximum protein intake 24.94 g and mothers who were sweeper her children's protein intake 25.75 g. The value of correlation coefficient was non-significant at 5 per cent level of significance.

Table 5.18 Distribution of respondents according to protein intake and mother's occupation

Occupation	N	Protein (g)	SD
Agriculture	45	24.27	2.10
Business	115	24.94	2.63
Housewife	25	25.26	1.99
Labour	13	24.31	2.16
Sweeper	2	25.75	1.56
r	-0.0651		

Table 5.19 shows that fat content of the respondents occupation wise that maximum fat content (40.72 g) of the children respondents whose mothers house wife and 38.75 g fat content of the children whose mother's occupation business like shop etc. The variation was more 5.15 of the fat intake of the respondents his mothers occupation agriculture. The correlation coefficient was significant (0.1982*) at 5 per cent.

Table 5.19 Distribution of respondents according to fat content and mother's occupation

Occupation	N	Fat (g)	SD
Agriculture	45	38.29	5.15
Business	115	38.75	4.86
Housewife	25	40.72	3.44
Labour	13	39.15	3.06
Sweeper	2	38.60	4.24
r	0.1982*		

Table 5.20 indicates that the labour class mother's child height was maximum (100.44 cm) and business class occupation of the mother's child height was 94.67 cm and correlation coefficient was found to be non-significant.

Table 5.20 Distribution of respondents according to height and mother's occupation

Occupation	N	Height (cm)	SD
Agriculture	45	93.78	10.48
Business	115	94.67	10.48
Housewife	25	92.95	8.87
Labour	13	100.44	7.00
Sweeper	2	93.50	4.95
r		0.0124	

Table 5.21 shows that energy intake of children respondents according to family size, energy intake of the children respondents were decreases according to family size increases, the value of standard deviation 202.00 Kcal and 200.23 Kcal were in 3 members and 7 members of the family respectively. The correlation coefficient was found to be non-significant between energy intake and family size.

Table 5.21 Distribution of respondents according to energy intake and family size

Family size	N	Energy (KCal)	SD
3	6	1341.42	202.00
4	57	1314.28	178.02
5	85	1272.65	182.74
6	42	1282.17	177.06
7	8	1211.63	200.23
8	2	1200.12	196.14
r		-0.0218	

Table 5.22 shows that maximum average protein intake of the respondents were having 7 members of the family followed by 24.98 g average protein intake of the respondents were having 5 members of the family. The

correlation coefficient was found to be negative correlated hence according to family size the protein intake of the respondents' decreases.

Table 5.22 Distribution of respondents according to protein intake and family size

Family size	N	Protein intake (g)	SD
3	6	23.40	2.13
4	57	24.74	2.31
5	85	24.98	2.55
6	42	24.77	2.25
7	8	25.15	1.99
8	2	21.25	0.92
r	-0.1961*		

Table 5.23 shows that maximum 41.59 g fat intake of the children respondents were having family size 7 followed by 39.80 g average fat intake of the respondents belonging to 6 members family size and maximum variation 5.26 of the fat intake in 5 member family size and fat intake and family size was negatively correlated to each other hence one decrease in the fat intake of the respondents according to size increases of the family members.

Table 5.23 Distribution of respondents according to fat content and family size

Family size	N	Fat content (g)	SD
3	6	38.80	1.67
4	57	39.17	4.33
5	85	38.12	5.26
6	42	39.80	4.47
7	8	41.59	3.77
8	2	36.90	0.57
r	-0.1220		

Table 5.24 Distribution of respondents according to height and family size

Family size	N	Height (cm)	SD
3	6	99.92	5.67
4	57	95.27	10.96
5	85	92.99	11.24
6	42	95.34	7.12
7	8	97.32	4.47
8	2	97.11	5.01
r	0.0689		

Table 5.24 reveals that maximum average height (99.92 cm) of the respondents were having 3 members of the families followed by 97.32 cm average height of the respondents were having 7 members of the family and correlation coefficient between height of respondents and family size non-significant at 5 per cent probability level.

Table 5.25 Distribution of respondents according to weight and family size

Family size	N	Weight (g)	SD
3	6	18.53	1.73
4	57	15.58	2.95
5	85	14.36	2.59
6	42	14.34	2.85
7	8	13.49	2.19
8	2	12.16	2.11
r	-0.2198*		

Table 5.25 shows that distribution of respondents according to weight and family size that average weight of the respondents were high in 3 members of the family and weight of the respondents were decreases according to size of the members increases. Maximum variation 2.95 in the weight was found to be in 4 members family size. The correlation coefficient was negatively non-significant.

Table 5.26 Distribution of respondents according to mid upper arm circumference and family size

Family size	N	Mid upper arm circumference (cm)	SD
3	6	19.83	1.21
4	57	16.24	2.92
5	85	16.26	2.45
6	42	15.86	2.51
7	8	15.13	1.36
8	2	15.00	2.00
r	-0.1452		

Table 5.26 indicates that 19.83 cm mid upper arm circumference of the respondents were belonged to 3 members in the family and according to family size increases the mid upper arm circumference of the respondents decrease and more variation of mid upper arm circumference was found to be in 4 members family size. The value of correlation coefficient between mid upper arm circumference and family size was found to be negatively significant.

Table 5.27 Distribution of respondents according to protein intake and mother's education

Mother's education	N	Protein intake (g)	SD
Illiterate	35	24.90	2.43
Up to Primary	47	24.66	2.37
Secondary	93	24.95	2.38
High school & above	25	24.31	2.53
r	0.1913*		

Table 5.27 shows that maximum average protein intake (24.95 g) of the respondents were belonged to his mothers education secondary level and 24.90 g protein intake of the respondents were belonged to mother's education uneducated. The correlation coefficient positively correlated with protein intake and mother's education (0.1913*).

Table 5.28 Distribution of respondents according to fat content and mother's education

Mother's education	N	Fat content (g)	SD
Illiterate	35	40.64	3.74
Up to Primary	47	38.91	4.56
Secondary	93	38.80	4.98
High school & above	25	36.98	4.80
r		0.1994*	

Table 5.28 indicates that maximum average fat content (40.64 g) of the respondents have mother's education illiterate and average (38.91 g) fat content of the respondents have mother's education up to primary level. Maximum variation 4.98 of the fat content was show in education up to secondary level. The correlation coefficient was significant (0.1994*) between fat and education of mothers.

Table 5.29 Distribution of respondents according to height and mother's education

Mother's education	N	Height (cm)	SD
Illiterate	35	94.55	7.56
Up to Primary	47	93.64	14.57
Secondary	93	94.51	9.03
High school & above	25	96.96	6.48
r		0.0589	

The perusal of the Table 5.29 reveals that maximum average height (96.96 cm) of the respondents, his mother's education were having high school and above and maximum variation of the height were found to be mother's education up to primary level. The correlation coefficient (0.0589) between height and mother's education were non-significant.

Table 5.30 Distribution of respondents according to weight and mother's education

Mother's education	N	Weight (kg)	SD
Illiterate	35	14.99	2.56
Up to Primary	47	15.14	3.33
Secondary	93	14.65	2.75
High school & above	25	14.61	2.57
r		-0.0613	

Table 5.30 shows that maximum average weight of the respondents (15.14 kg) his mother's education up to primary level followed by 14.99 kg average weight of the respondents and that mother's education illiterate. The correlation coefficient (-0.0613) was found to be non-significant between weight of the respondents and mother's education.

Table 5.31 Distribution of respondents according to mid upper arm circumference and mother's education

Mother's education	N	Mid upper arm circumference (cm)	SD
Illiterate	35	15.93	2.87
Up to Primary	47	16.41	3.01
Secondary	93	16.30	2.50
High school & above	25	16.20	1.85
r		0.1106	

Table 5.31 shows that distribution of respondents according to mid upper arms circumference and mother's education, 16.41 cm mid upper arms circumference of the respondents were high his mothers' education up to primary level and 16.30 cm mid upper arms circumference of the respondents his mother's education have up to secondary level. Maximum variation 3.01 of mid upper arms circumference was showed in education up to primary level.

Table 5.32 Distribution of respondents according to energy and mother's education

Mother's education	N	Energy (KCal)	SD
Illiterate	35	1247.09	156.36
Up to Primary	47	1290.33	189.53
Secondary	93	1296.88	181.08
High school & above	25	1339.12	188.49
r		0.1424	

Table 5.32 indicates that high energy (1339.12 KCal) intake of the children respondents and mother's education high school and above in that group. More variation of energy were found in mother's education up to primary level.

Table 5.33 Correlation coefficient between nutrients intake and height, weight and mid upper arms circumference

Nutrients intake	Height (cm)	Weight (kg)	Mid upper arms circumference (cm)
Protein (g)	-0.1050	-0.1079	0.0806
Fat (g)	0.0121	0.2316*	0.1996*
Energy (KCal)	0.5310*	0.7524*	0.6360*

Table 5.33 shows that correlation coefficient between nutrients intake and height, weight and mid upper arms circumference that correlation coefficient between energy intake and height, weight and mid upper arms circumference was found to be significant at 5 per cent level of significance concluded that according to energy of the respondents increases height, weight and mid upper arms circumference was also increases. Fat of the respondents were increases then they gain weight because weight and fat was positively correlated to each other. Fat and mid upper arms circumference was of the respondents significantly positively correlated to each other hence according to fat mid upper arms circumference was also increases.

Table 5.34 Distribution of the mothers regarding knowledge of nutrition

Grade	Knowledge	
	Frequency	Per cent
Poor (< 30 %)	118	59
Good (30-50 %)	52	26
Very good (> 50 %)	30	15
Total	200	100

Above Table 5.34 reveals that majority of the selected mothers in the slum area (59 %) had poor knowledge regarding nutrition. Only 15 per cent of the respondents had very good knowledge regarding nutrition while rest i.e. 26 per cent had good knowledge of it.

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SUMMARY
&
CONCLUSION

Chapter-VI

SUMMARY AND CONCLUSION

If one looks into the near by poor men's colony from balcony of a tall residential building in any major city of India and continues to look for some time, panorama of life becomes clear in which men live in conditions comparable only with animals. The number of slum dwellers is enormous and their lives is quite lamentable and living conditions absolutely paralysed when along with other problems there is 'NO FOOD'. The viscious cycle of poverty encircles them in such a way that they are not able to feed themselves and their children. Their unsatisfactory diet reflects wide prevalence of signs of malnutrition.

Therefore, an effort to investigate the monthly food consumption of families and the nutritional status of the preschool children was considered worth while so that a general idea could be drawn regarding the deficiency in the food intake (qualitative and quantitative both). The present study entitled, "Dietary profile of preschool children of slum dwellers of Shillong city in Meghalaya state" was conducted in different slums of Shillong. The study was conducted with the following objectives.

1. To study the monthly food consumption of families living in the slum.

2. To compare the food consumption of slum dwellers with the recommended food allowances.

3. To study the dietary intake of pre-school children in the above families.

4. To analyse the dietary intake of above pre-school children in terms of nutrients intake.

5. To assess the nutritional status of the above pre-school children.

6. To find the relationship between the nutrients intake and nutritional status of above children.

7. To give them nutrition education to improve the nutritional status of the families living in the slum.

200 families from the slum and 200 preschool children from the selected families were selected by three stage random sampling technique. Thus, general information was taken along with the specific information about the family from the head of the family. Information about the preschool children was taken from mothers. Tools adopted for the study were schedule and interview method. A proforma was filled up which consisted of general information, specific information, dietary survey, anthropometric measurement and clinical examination of the children. At last nutrition education was given to mothers in the slum.

Data thus obtained was analysed and statistically tested. The results of the present study are :

Maximum 54 per cent of the respondents belonged to 2-4 years age group and 57.5 per cent of the respondent's mothers were of business class. 46.50 per cent respondent's mothers were educated up to secondary level and 72.50 per cent respondents belonged to monthly family income of Rs. 3500 and above. 71.94 per cent respondents belonged to schedule caste Christian community and their monthly earning was Rs. 3500 and above.

It was observed that 83.00 per cent of respondents resided in mixed type of house and 17.00 per cent in Kachcha houses.

In relation to surroundings and ventilation, 130 per cent of the people of the slum have fair surroundings and 100 per cent had satisfactory ventilation. 120 per cent were bath daily and 117 per cent were wash clothes daily. 140 per

cent of them clean the house once a day and 110 per cent cut their nails twice in a month and 145 per cent clean their hands before having meals.

Average protein intake was 25.06 g of the respondents in the age-group of 2-4 years. Maximum deficiency of protein was observed as 18.6 per cent for the infants of the age-group 4 to 6 years while for the same age-group respondents showed average energy intake of 1472.15 KCal. In the age group of 2-4 years maximum deficit per cent of energy was 17.9 per cent. Correlation efficient was significant at 5 per cent between energy and age group of the respondents. Fat content of 39.16 g was in the age-group of 2-4 years. While maximum deficit of fat content was 57 per cent for the respondents of the same age-group.

Average height was 100.17 cm for the respondents of the age-group 2-4 years. The correlation coefficient 0.5357 was significant between the height and age of the respondents. Maximum 16.91 kg weight was for the respondents of 4-6 years. Mid upper arm circumference of 18.94 cm was for the age-group of 4-6 years. Correlation coefficient was significant (0.2787*) at 5 per cent probability level between mid upper arms circumference and age group of the respondents.

Average weight 16.40 kg of the respondents mothers were sweeper occupation and 15.59 kg average weight of the respondent's mothers were labour occupation. 16.50 cm average mid upper arms circumference of the respondent's mothers was sweeper occupation. 1341.92 KCal average energy intake of the respondent's mothers was labour class. 25.75 g average protein intake of the respondent's mothers was sweeper class. 40.72 g average fat content of the respondent's mothers was housewife. 100.44 cm average height of the respondent's mothers was occupation labour class. Maximum average 1341.42 KCal energy intake of the respondents family size 3 members. Correlation coefficient was negatively correlated. 25.15 g average protein intake of the respondents was belonged to 7 members family size followed by 5

members of the family having 24.98 g average protein intake. 41.59 g average fat intake of the respondents was belonged to 7 members family size. Average 99.92 cm height of the respondents was having 3 members family size. 18.53 kg average weight of the respondents was belonged to 3 members family size and the value of correlation coefficient between mid upper arms circumference and family size was negatively significant correlated. 19.83 cm mid upper arms circumference of the respondents were belonged to 3 members family size. Average protein intake (24.95 g) of the respondents was mother's education up to secondary level. Average protein intake of the respondents depends upon the mother's education. 40.64 g average fat content of the respondent's mothers was uneducated. Average height (96.96 cm) of the respondents mothers education were high school and above. Average weight (15.14 g) of the respondents mother's education up to primary level. Average mid upper arms circumference 16.41 cm of the respondents mothers education up to primary level. Average energy intake (1339.12 KCal) of the respondents mothers education were up to high school and above. The correlation coefficient between nutrients intake and height, weight and mid upper arms circumference was found to be significant at 5 per cent level of significance.

In relation to nutrition education 59 per cent of the mothers had poor knowledge. Only 15 per cent of them had very good knowledge regarding nutrition.

At last but not the least, it can be concluded that the intake of protein, energy and fat were more than the RDA. Their height and weight was of optimum level. The nutrient intake was more or less adequate than the RDA. So the prevalence of malnutrition in this state is not so severe especially among the preschool children.

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SUGGESTIONS
AND
POLICY IMPLICATIONS

Chapter-VII

SUGGESTIONS AND POLICY IMPLICATION

1. Political action to eliminate poverty and deprivation to reduce inequalities within a country.

2. Executing targeted policies in agriculture, health, and infrastructure development should be given due consideration.

3. Promoting PMC as one of the strategies of ensuring proper nutrition.

4. Recognising the special role of women and the necessity of community participation in decision-making as well as actual activities.

5. There should be access to resources by the malnourished.

6. Promotion of the education and status women in the community. Mother's level of education was a dominant factor in whether or not a child becomes malnourished.

7. Improvement of water supply and sanitation. Many studies had documented the impact of improving water supply and disposal of excreta on reducing diarrhoeal morbidity.

8. Development and implementation of food and nutrition policy in the country.

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APPENDICES

APPENDICES

APPENDIX-1

QUESTIONNAIRE

GENERAL INFORMATION OF THE RESPONDENT

1. Name of the slum ....

2. Name of the respondent ....

3. Age ....

4. Education ....

5. Caste ....

6. Religion ....

7. Occupation of the respondents ....

8. Income of the respondent ....

9. Income of the respondent ....

10. Size of the family ....

11. House number ....

12. House (own/on rent/illegal) ....

13. Number of rooms ....

14. Type of house (Kachcha/Pucca/Mixed ....

15. Facilities at home ....

    a) Water (own/community) ....

    b) Latrine (own/community) ....

    c) Slum (Electricity/kerosene oil) ....

16. Duration of residence in the slum ....

17. Food habit (vegetarian/non-vegetarian) ....

SPECIFIC INFORMATION

SECTION –A

* Hygienic condition of the surrounding

    1.   Good

    2.   Average

    3.   Poor

* Ventilation

    1.   Good

    2.   Average

    3.   Poor

* Do you take bath daily   :   Yes/No
* Do you wash your clothes daily   :   Yes/No
* How many times in a day you clean your home ?   :   Once/twice/thrice
* How many times you cut your nails in a month ?   :   Once/twice/thrice
* Do you wash your hand with soap before having foods ?   Yes/No
* Do you wash your hands with soap after having foods ?   Yes/No

SECTION B

* How many times do you eat food ?

    1. Morning

    2. Afternoon

    3. Evening

    4. Night

* Which type of diet you have taken in your daily meal ?

    1. Cereals

    2. Pulses

    3. Milk and milk products

    4. Meat

    5. Fish

    6. Egg

    7. Fats and oils

    8. Sugar and jaggary

* 24 hour recall method

Time of meal	Item	Ingredient	Quantity

* Are you regular in taking meals ? : Yes/No
* Do you eat in-between your meal ? : Yes/No
* Do you eat outside at home also ? : Yes/No
* If yes, how many times ? : Every day/once in a week/twice in a week/once in 15 days
* How many times do you give milk to your child ? Once/twice/thrice etc.
* What does your child need for proper development and growth ?
* What else do you give to your child other than milk ?
* What do you do for the cleanliness of your children ?
* Are your child fulfill the criteria given by ICMR ?

Recommended daily nutrient allowance	Taken meal

SECTION – C

Anthropometric measurement

1. Height (cm)   :
2. Weight (kg)   :
3. Left mid arm circumference (cm) :
4. Chest circumference (cm)   :
5. Head circumference (cm)   :

Clinical survey :

Nutritional Deficiency Symptoms

1. Hair   :   Normal/lack of luster/thinness and sparsness/dispigmentation/easy pluckability/flat sign
2. Eyes   :   Normal/pale ocnjunctiva/bitots spot/night blindness
3. Lips   :   Normal/angular stomatitis/angular scars/cheilosis
4. Tongue :   Normal/scarlet and raw tongue/magenta tongue/oedema
5. Teeth   :   Normal/mottled enamel/dental carries/dental flourosis
6. Gums   :   Normal/spongy gums/bleeding gums
7. Skin   :   Normal/xerosis/pellagrous dermatosis
8. Nails   :   Normal/brittled/patched
9. Muscular system : Normal/oedema/muscle wasting
10. Skeletal system : Normal/knock knees/bow legs

SECTION - D

* What do you do to improve your nutritional status ?

* From which source you get nutrition education ?

    1. T.V.
    2. Radio
    3. Newspaper
    4. Magazine
    5. Drama
    6. etc.

APPENDIX-2

The Nutritive Composition of the Comprehensive Food Exchange List

Food Exchange	Raw Food		Energy (kcal)	Protein (g)	Fat (g)
	Amount (g)	Measure			
Milk	250 ml	1 C	170	8	10
Meat	40	1 egg	70	7	5
Pulse	30	3 T	100	7	neg.
Cereal	20	1 bread slice	70	2	neg.
Vegetable B	Variable	-	40	2	neg.
Fruit	Variable	1 portion	40	neg.	neg.
Fat	5	1 t	45	-	5
Sugar	5	1 t	20	-	-

Source: Textbook of Nutrition and Dietetics by Dr. (Mrs.) S. Malhan. Deptt. of Food & Nutrition, Institute of Home Economics, University of Delhi, pp. 30.

APPENDIX-3

Recommended Dietary Allowances for Pre-school Children

Particulars	Body Wt. (kg)	Net Energy (kcal/d)	Protein (g/d)	Fat (g/d)
1-3 years	12.2	1240	22	25
3-6	19	1690	30	25

Source: Nutritive value of Indian Food by C. Gopalan; B.V. Ramasastri and S.C. Balasubramanian. National Institute of Nutrition, ICMR, Hyderabad, 1990.

Investigator Interviewing the subject
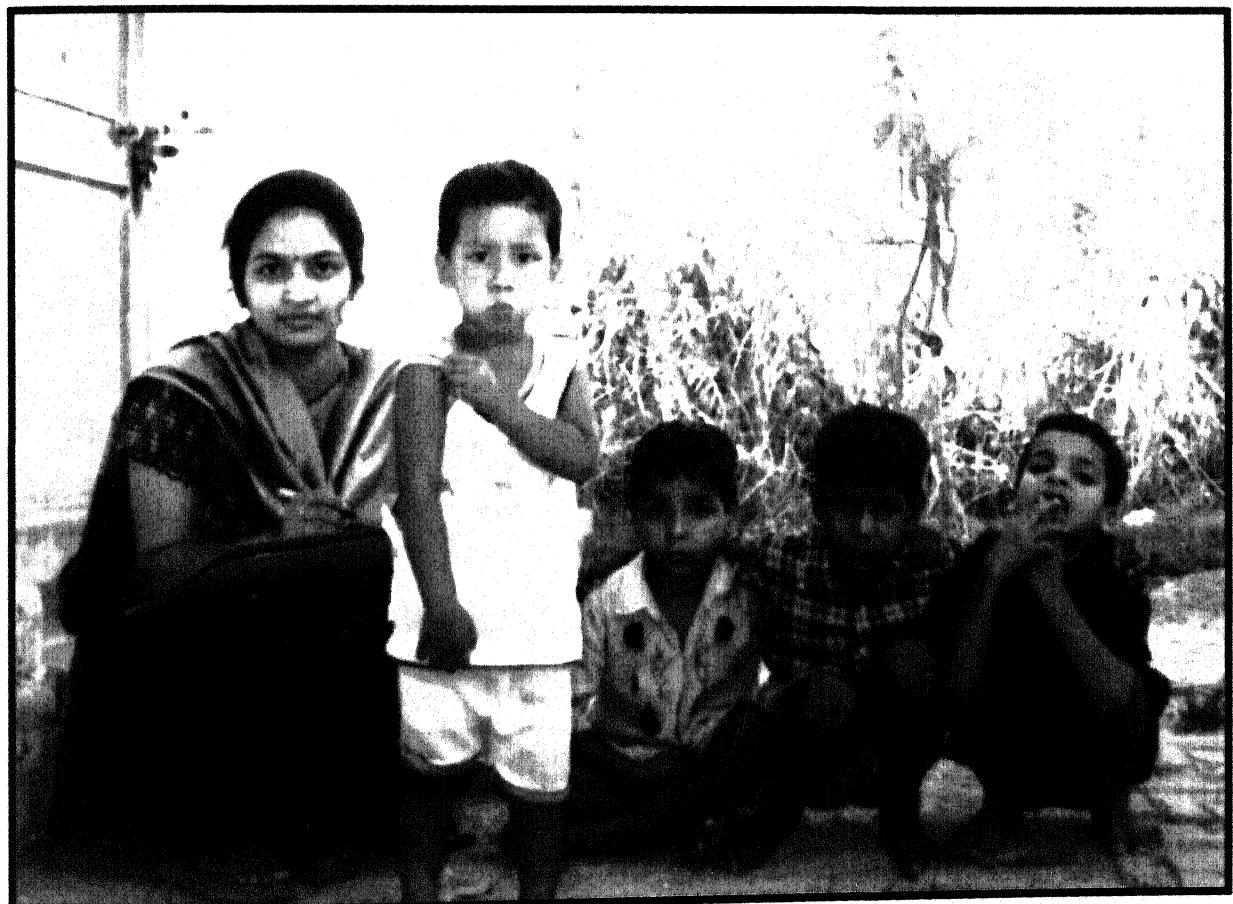

Investigator Investigating the subject
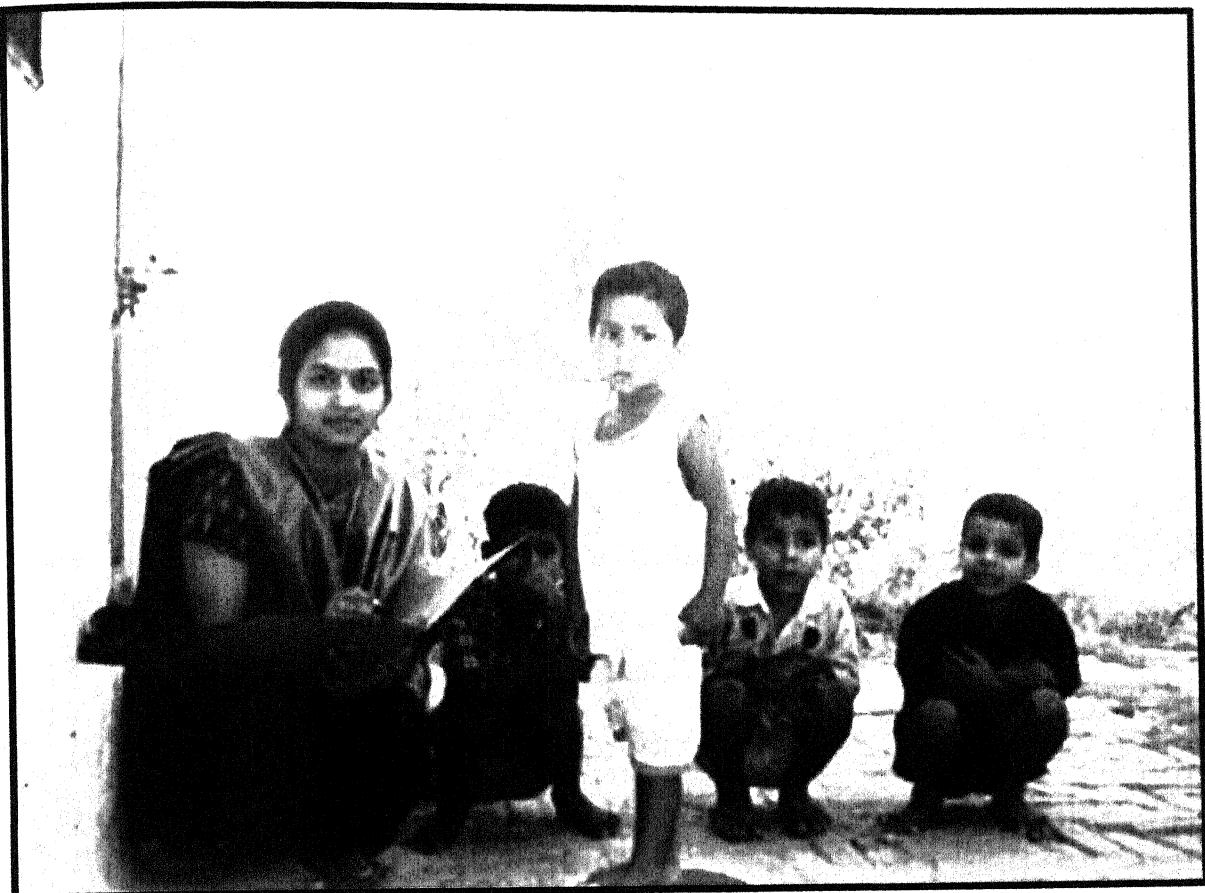
Collecting Data on Anthropometric Measurement (Weight of Subject)

Collecting Data on Anthropometric Measurement (Height of Subject)

Investigator Investigating Food Preparation

Sample of Food